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PRACTICAL WINERY & VINEYARD (ISSN 9739-8077) is owned and published by PWV Incorporated. Published bi-monthly at subscription rate of $31/year. Outside the United States, please add $10US, sea mail; $18US, air mail. Postmaster: Please send change of address to 15 Grande Paseo, San Rafael, CA 94903. Back issues: $5 prepaid. News media may use no more than 1/4 page of material per issue provided that PRACTICAL WINERY & VINEYARD is credited.

PRACTICAL WINERY & VINEYARD

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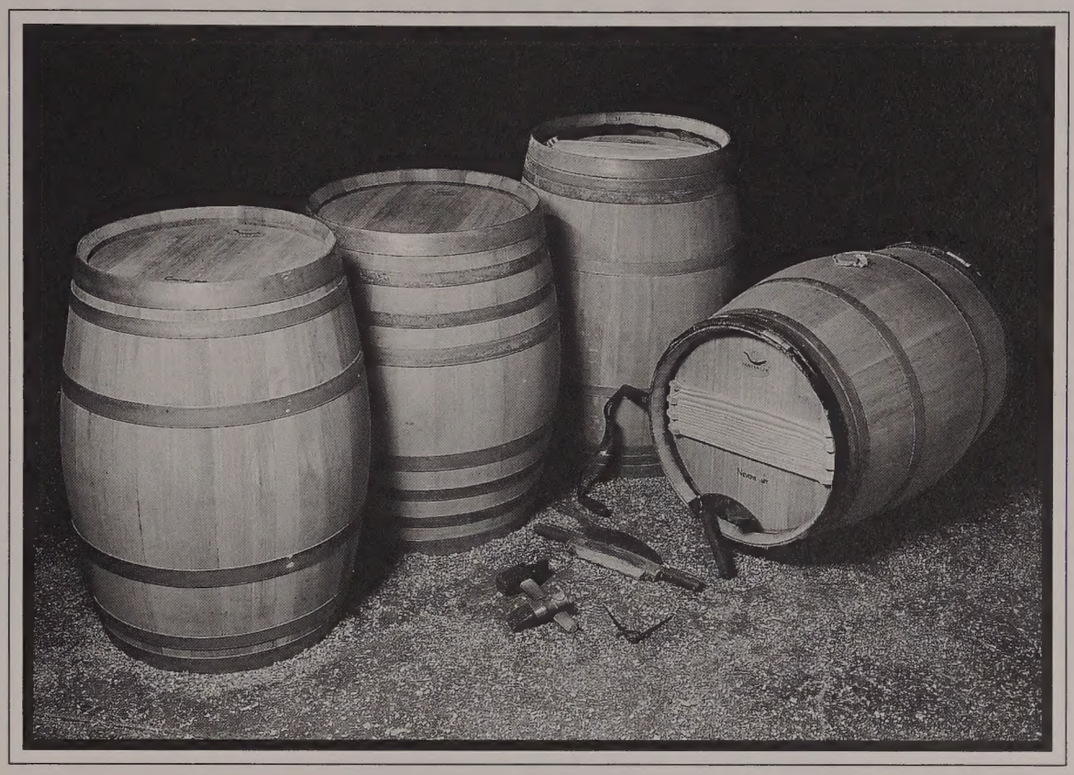

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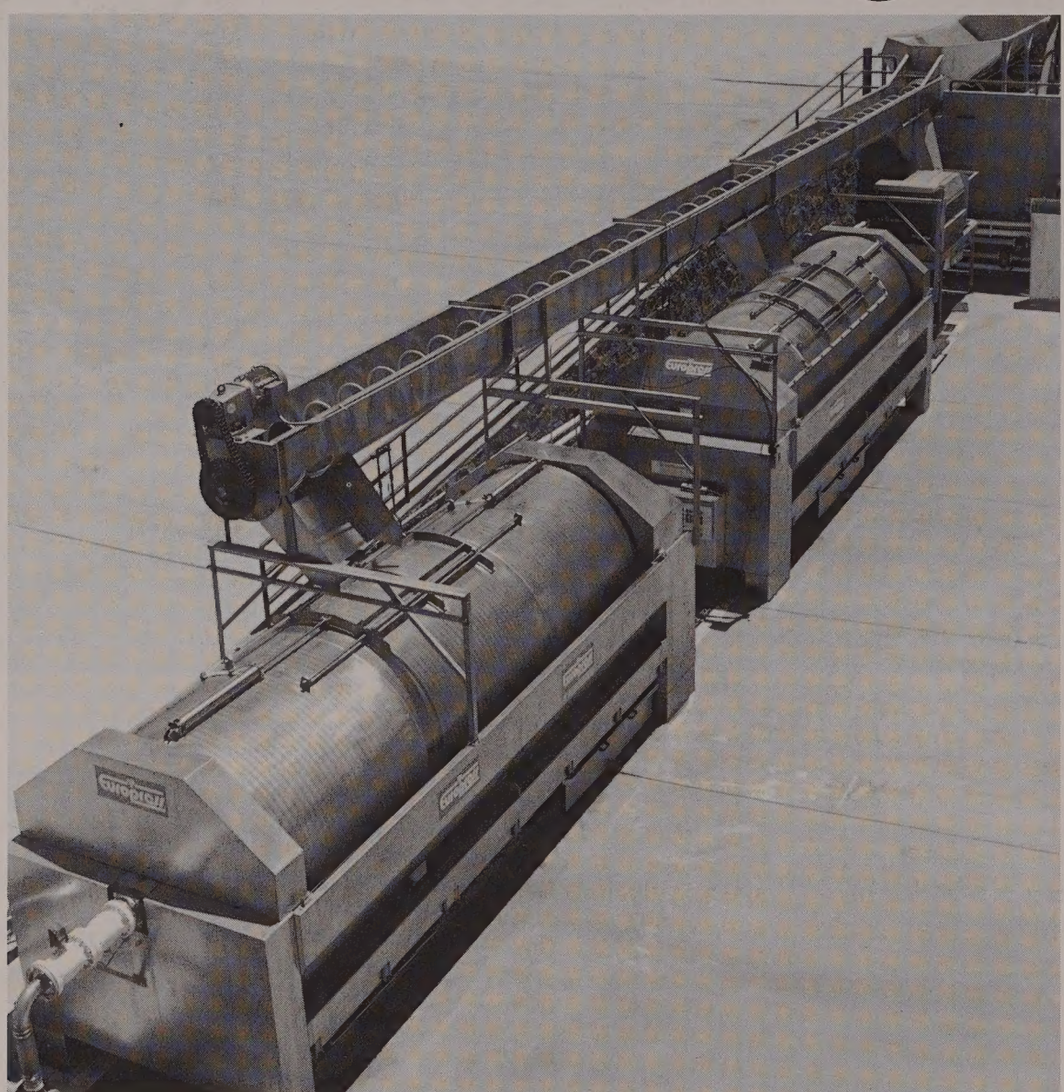

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LETTERS

DEAR EDITOR:

I have a few comments to share about the story "Making Food Wine Friendly" in the Nov/Dec-1998-*PWV* (page 24). I respect Master of Wine Tim Hanni's hard work and applaud his encouragement of sensible, "progressive" wine lists. But I have a few bothersome, philosophical differences that perhaps should be heard.

Hanni proposes that restaurants adjust their dishes to compliment wines according to his Wine and Food in Balance principles. Wine savvy restaurants should certainly do this when preparing dishes for winemaker events and food/wine degustations. But if he's suggesting that all chefs should alter their basic cooking style and for commercially available wines, then he must be smoking his corks. Although wine is popular, it is far from the top reason why people eat out in restaurants. People appreciate good food and service first, and maybe a nice view and free parking third or fourth. Wine is what we serve to ***enhance*** our guests' restaurant experience; it's almost never our primary focus.

In other words, Hanni is putting the proverbial cart before a horse. In fact, we could all be better served if *wineries* would do a better job of producing wines that go better with our chefs' food, rather than the other way around.

The value of Hanni's *Wine and Food in Balance* is dubious. In our business, we have enough trouble teaching our chefs and servers principles as basic as dryness/sweetness, body, acidity, tannin, and the endless nuances of aroma and flavor. On top of that, Hanni suggests that we interrogate our guests as to whether they like things "strong" or "mild," and whether we can sense that mysterious yet tangible quality of *umami* or "delicious." To this I ask, who cares? What does liking things "strong" have to do with which Cabernet Sauvignon I should have with my lamb? Such things are already givens.

So salt makes wine "mild" and also balances umami? Big deal. Every chef worth his salt knows that if you use too much then you should use less, balance it with pepper or sugar, or else suggest a wine that is slightly sweet or at least a little fruity to wash it down. In short, Hanni's peculiar new language complicates, rather than simplifies, gastronomic issues which really should remain as simple as A, B, C.

At Beringer Wine Estates, when investigating umami two years ago, it was suggested to me that the best wine for roast beef may very well be White Zinfandel. In *PWV*, Hanni talks about the wonders of being able to combine a tannic red with a mango salsa with caramelized onions, hot peppers, and/or spice. Imagine if our 12 restaurants became so adventurous. No thank you. I think I'll take my business elsewhere. Is Hanni helping or hindering the on-premise industry?

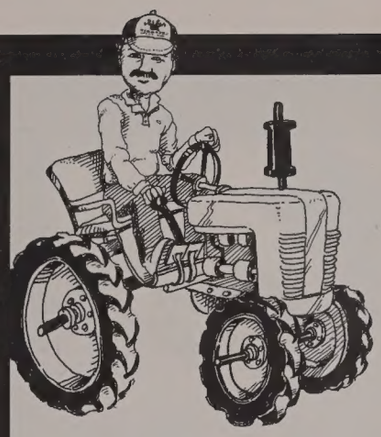
Although Hanni's more original ideas may ultimately prove to be something that countless other experts have somehow overlooked, for me the most important issue is one of usefulness. Do we really need to turn food and wine matching, restaurant service, and wine list and menu writing into abstractions? Why do we need a "fifth taste?" Isn't having four hard enough?

If anything, I would suggest to Hanni that he take his concept and concentrate more on incorporating it specifically into Beringer's marketing and winemaking programs. Frankly, I think wineries could use a lot more help in understanding restaurant needs. I mean, when was the last time you saw a winemaker drawing a Cabernet Sauvignon from a barrel and saying, "I think I need to lower the acid a little bit to go with Roy's Mongolian-style Cabernet reduction?" To suggest that chefs should stand by their pots and fret over their sauce's usability with Beringer Cabernet Sauvignon is almost insultingly, well, oeno-centric.

Randy Caparoso,
Roy's Restaurant, Honolulu, HI

TIM HANNI'S RESPONSE:

I'm pleased that Randy Caparoso applauds the premises behind the Beringer Progressive Wine List, which is now employed in well over 1,000 restaurants and hotels from Atlanta, GA, to Beijing, China, and Zurich,



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LETTERS

Switzerland. Using this system, a restaurant arranges the wine list so that customers can easily find the wines they enjoy most. Even many of our competitors, such as Banfi Vintners, are endorsing the system, with acknowledgement to Beringer Wine Estates.

As to my wine and food principles which do bother Mr. Caparoso, let me restate the premise of Wine and Food in Balance: once the food is balanced by the chef, "*any* food on the menu will taste good with *any* wine on the list ... a wine will maintain its positive elements for someone who likes the wine to begin with."

The chef does not have to change a balanced dish in any way for different wines. And nowhere do I recommend that "all chefs alter their basic cooking style." The principles I promote — which show how simple adjustments to dishes, typically in levels of salt and acidity, can ensure that a wine tastes as the winemaker intended it to — are usually very minor and very often completely unnecessary, as most chefs have already achieved the balance in their food. This is borne out by dozens of tastings I've done with chefs and key dining room staff.

My principles are founded in classic French cuisine, easily applied to any type of cuisine, validated by food and sensory scientists, and endorsed by many chefs I've worked with, including Jeremiah Tower at Star's in San Francisco; Christian Rassinoux and Yvon Goetz at the Ritz-Carlton Laguna Nigel, CA; and James Moore from the American Lamb Council, to name just a few. They all agree that there is absolutely no sacrifice to the integrity of their cuisine.

"The techniques I learned from the Wine and Food in Balance segment of the Beringer Progressive Wine List system are now a fundamental aspect of every dish I have created over the past two years," says Mercer Mohr, executive chef at the Clift Hotel, San Francisco. "I would never have accepted this program if it compromised the taste of my food in any way. My food tastes great and our customer's dining experience is enhanced even further." So rather than saying, "I'll take my business elsewhere," customers seem to be saying, "Thanks for respecting me as a consumer, I will bring my business back here."

What Mr. Caparoso calls my "peculiar new language" is the result of my work with food and sensory scientists to develop clear, simple, and scientifically valid definitions for simple words, such as taste, flavor, aroma, and bouquet, and to demonstrate objectively how the basic tastes in wine change in reaction to the basic tastes in foods. Part of this study is an exploration of the fifth taste (after sour, bitter, salty, and sweet) that Mr. Caparoso believes we don't need. Umami, the Japanese term for the savory taste, is recognized by many food scientists and experts; anyone is, of course, free to disagree. Personally, I'm looking forward to continuing to explore this taste, how it affects wine and food pairing, and even how it may be used in the future to help assess wine quality (but that's another story).

I agree that "wineries could use a lot more help in understanding restaurant needs." That is why we at Beringer Wine Estates have invested over 15 years in a project called "Train the Trainer." We have worked with hundreds of hospitality professionals to discover their needs in making it easier for their customers to choose wines. The Beringer system was invented by restaurant professionals to address needs that we all share.

As part of our wish to reassess our assumptions about the role of wine at the table (or elsewhere) and to start critically observing what we are doing with wine and food, we have created a partnership with the California Polytechnic State University, San Luis Obispo. As Robert Noyes, PhD., of Cal Poly's Food Science and Nutrition Department says, the university is creating "a new curriculum that will become an industry standard for wine and food studies." I would like to invite ***PWV*** readers to enroll in the inaugural five-day program at Cal Poly on June 21-25, 1999. We can debate all these issues and others affecting the global consumption of wine. I can't promise Mr. Caparoso that we'll smoke corks — but you never know!

Tim Hanni, MW
Beringer Wine Estates

Integrity Awards honor industry leaders

Integrity Awards were presented to three wine industry persons by the Lodi-Woodbridge Winegrape Commission (LWWC) in November at a dinner held in Lodi, CA. The Wine Industry Integrity Award was developed to provide the industry with a positive example and to motivate those individuals who personify integrity.

"Competition in our industry is more fierce than ever, and the bottom line is often the sole motivating factor," said Mark Chandler, LWWC executive director. "We've created the award to provide positive reinforcement to those individuals whose integrity serves as an example to us all."

PATRICK CAMPBELL

Patrick Campbell, owner of Laurel Glen Vineyard, Santa Rosa, CA, and frequent contributor to *PWV*'s *Free Run* column, was selected as the first recipient of the Integrity Award. The selection committee of industry professionals pointed to Campbell's years of persistent fighting for honesty and fairness as the basis for their choice.

One nominating committee member offered: "Patrick remains true to his wine, as well as trying to keep it in the marketplace at prices that people can afford. He is active in what he believes in — direct shipping and the coalition for free trade." Another member said: "Patrick is focused on his wines and how they should be freely marketed. He is an activist, supporting direct shipping and free trade, but his efforts are for all wines."

A third committee member commented: "Every time I'm with him, I'm extremely impressed with every aspect of this man's being. He is a gentle, intelligent, sensitive individual who is dedicated to excellence in every area. He has been a consensus builder in our industry, yet in the process has endured slings and arrows from all sides. Still, he maintains a consistent, rational position on what are the proper sacrifices the industry should make and what are the proper areas where we should hold our ground. Patrick has been a strong supporter of the Wine Institute, while still supporting and working effectively with many organizations that have been perceived (erroneously I believe) as antagonistic to the Wine Institute. The fact that he is seen as an effective spokesman in all these organizations is indicative of the kind of integrity that he represents to all of us."

Patrick Campbell receives Integrity Award.

Others in the wine industry also offered their comments.

"No one, not anyone really, has staked out such a place of respect while speaking as a visionary for the industry as Patrick Campbell," said Bill Nelson, vice-president of government relations, American Vintners Association. "He's been forthright, he's been rational, and he's been honest. Maybe this is not such a great achievement in other fields, but in wine, where everybody is passionate and any 10 people represent at least 15 incompatible opinions, this is not so easy. It is especially difficult when you must also be the very public face of a company — which by necessity needs many customers and intermediaries — that is to say wholesalers and retailers. Besides all that, Patrick makes great wine. I've been especially proud to serve Patrick as a humble servant and to be privileged to receive so much wisdom from him while simultaneously enjoying his company. Really there could be no better choice for a laurel named the Wine Integrity Award."

"Patrick is, at heart, a winemaker," added attorney John Hinman, partner at Hinman & Carmichael, San Francisco, CA. "Everything that he does flows from that basic fact. One of my earliest memories of him is at Vin Expo either in 1989 or 1991. Patrick was sitting at a table at the Bistro De Sanme with probably 15 winemakers from six or seven different countries. I think the dinner started at about 8PM and the winemakers started pulling out their own bottles of wine — it ended somewhere around 4AM or 5AM in the morning. They were all talking about the politics of *terroir*, of the soil, and on that particular night I was impressed not only with Patrick's knowledge but his dedication to that part of the industry.

"It was also during that particular period that the Family Winemakers of California was formed out of the political chaos that was going on in the industry at that time, and Patrick was an essential participant, interestingly enough, more often than not as a peacemaker. Patrick has a fine and sensitive touch to other people's position, whether they are from a large winery, a corporate winery, or a small winery; and later on — as a direct shipment battle heated up in the mid-1990s — he understood the distributors and their position versus a winery and its position. It's been Patrick's role as a peacemaker, without compromising his own position, that makes him stand out from most of the other industry players."

"Campbell represents one of the bulwarks of the industry here in California in the sense that he's rock solid as a producer," said Peter Granoff, co-founder, Virtual Vineyards, retailer on the Internet. "The wines are always of impeccable qual-

ity, fairly priced. His Cabernet, for example, is the state Cabernet that could probably sell out three or four times over in actual production, and yet I think he's been very prudent in his price increases over the years. He has really been focused on producing wines that deliver value in the eyes of the end user, who is the customer for all of us. That's really refreshing in this day and age of hyper-inflated egos and prices to go with them — particularly in the category Patrick's in, California Cabernet. Not that the wines aren't great, they are, but he's been most prudent.

"He's a very articulate and passionate and clear thinking spokesman for the industry as well, on a wide variety of issues. I don't believe there is a disingenuous bone in his body. When you read a column by Patrick, it's always very well thought out and clearly delineated and articulated, and you walk away from the article thinking, 'Boy I wish I could write like that.' All-in-all, he's one of the people I admire most in the business, and it's a pleasure to do business with him. What you see is what you get and no curve balls. He's a straight shooter from start to finish."

"The selection committee considered a number of well-qualified men and women who have worked tirelessly on behalf of the American wine industry," said Karen Ross, president of California Association of Winegrape Growers (CAWG). "Patrick's name came from several different sources because of his absolute commitment to honest debate on industry issues with all viewpoints included, and because of his passion for making wine enjoyable and accessible for all consumers. Patrick is not a bystander, he is involved — a person whose actions reflect core values of honesty and fairness."

The following is an edited and expanded version of Patrick Campbell's acceptance of the first LWWC Integrity Award.

"Leave it to Lodi to come up with the idea of an integrity award! The glitzy parts of the wine world seem to applaud a different sense of value — big auction prices and high scores from the pundits, for example. Has the *Veritas* in the *Vino* disappeared?

"Not in Lodi. Here, the wines and people are forthright. Straight from the earth. Solid. Rock solid.

"Full of integrity.

"As John Gillespie of the Wine Market Council has observed, if more Americans are ever to drink more wine, we must expand our marketing beyond the 11% of American adults who consume 88% of the wine. In short, industry growth will come only from the sort of wines we make here in Lodi: delicious wines that regular folks and wine snobs alike can afford to enjoy on a daily basis.

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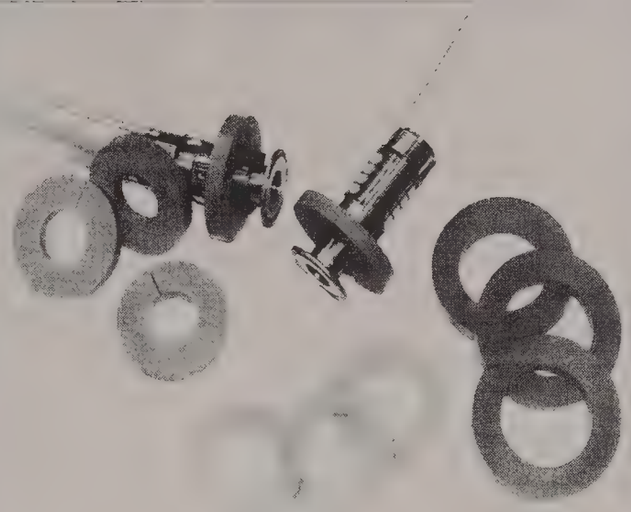

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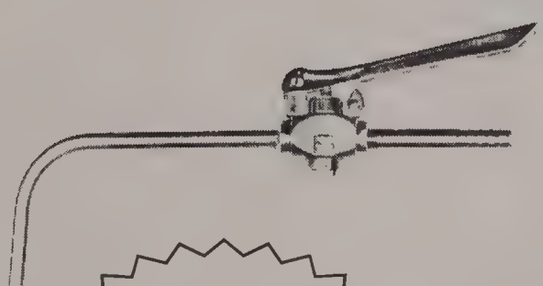

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"I'd like to recognize one of those equally worthy people, a guy I've had my battles with over the years — one many of us have had our battles with over the years, come to think of it! — but one without whom I wouldn't be here today.

"Bill MacIver (Matanzas Creek Winery, Santa Rosa, CA) has been the relentless conscience of this business for the past decade and has defined the important issues of our time, from small winery representation in the world of wine politics to the tyranny of the giant, multi-state distributor network.

"This man has integrity.

"I began in the wine business 25 years ago with my gut: I liked to drink wine, and the first time I saw those old vineyards on Sonoma Mountain, I sensed my life's direction.

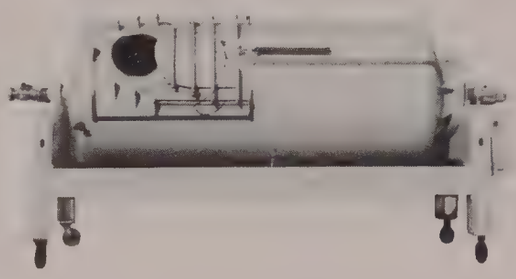
"I've since been sustained, intellectually and emotionally, by the business as well. I can't think of any profession that affords so many opportunities to practice one's fundamental belief in the value of personal freedom and the right of free speech as the wine business. For someone like me, a product of the late 1960s, speaking out just comes naturally!

"Every day, I look out from my vines to a red earth vineyard on the Mayacamas Mountains, far over across the Valley of the Moon. The vineyard is named Monte Rosso. The manager of that vineyard for many years was an old-timer named Joe Miami. He was my mentor — and the mentor of several other young guys just getting started in the vineyard business in the early 1970s; many of them have become legends in the wine world.

"I learned how to cane prune from Joe, how to drive a Cat over rocks, and how to distrust AxR-1. He disdained vineyards planted down in the valleys, and we used to sit out on his porch in Boyes Hot Springs, talk rootstocks, and drink his homemade Zinfandel out of jelly jars — the first Zin I ever tasted, and still one of the best!

"Another one of these people I met only a few times, but he influenced me in ways he never knew. I'm sorry I never took the time to tell him. He was Joe Miami's boss, Louis Martini. I guess it was enough for me at the time that a Napa man had the good sense to plant his finest vineyard up in the Sonoma mountains and that he hired a guy like Joe to farm it.

"Again, integrity comes in many forms. We all, in our own ways, live it, whether it's fighting the big distributors, championing the rights of the little guy, promoting the goodness of wine, supporting our families, helping some young fellas learn the craft and passing on a few nuggets of wisdom gleaned over the years, or just



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being a quiet symbol of strength and integrity in a business that oft times rewards form over substance.

"Many of us who have been in the business for our adult lives (so far!) are beginning to think about the next generation. Passing the torch on to our kids. How will that torch burn? Bright with the same intensity that attracted us to wine? Or smoky with compromised ideals?

"Will fruit cocktails masquerading (and labeled) as wine supplant *terroir* and varietal-based wines? Will the mighty distributor networks snuff out small independents? Will, the market dominance of enormous, corporate wineries kill off the medium-sized wineries? Will 50 state governments condemn shipments of wine direct to consumers? Will mindless repetitions of 100-point scores become the sole marketing strategy of wineries?

"Will the *Veritas* in the *Vino* become archaic?

"Will the folks in Lodi run out of awardees?

"Not likely."

LOUIS P. MARTINI

The late Louis P. Martini of Louis M. Martini Winery (St. Helena, CA) also received an Integrity Award for his lifetime contribution and example of integrity to the industry. While the award is meant to honor a living, active member of the industry for his or her ongoing efforts, the committee unanimously expressed its desire to honor Martini.

The LWWC asked several industry people to reflect on memories of Martini.

Jim Wolpert, chair of the Department of Viticulture & Enology at U.C. Davis, said, "It's a great pleasure for me to say a few words about Louis Martini. I think there are few who could equal Louis Martini as a supporter of our department. He was a graduate of UC Berkeley. But I think when it came to the Department of Viticulture & Enology, Louis' generosity really showed. In fact, some faculty members tell stories about when they went to ASEV meetings for the first time to present their work, one of the first people up to the podium was Louis Martini who would introduce himself and ask questions. In that way, he began relationships that continued for many, many years with both our current faculty and some recently retired faculty members.

Carolyn Martini accepts her father's award from Gerald Boyd.

"One of the places he had the most involvement with us — and one that I think is a lasting achievement — was his work with Harold Olmo, working with Chardonnay clones. Many of you now recognize them as the Olmo clones, but actually to some degree, they're the Martini clones. Martini had collected some of these materials from Stony Hill Vineyard, which originally was Wente, and he worked with Harold to gather the materials and helped him evaluate them. Many of these Chardonnays are now in the UC Davis Foundation Plant Materials collection, and they are named the Martini selections. Martini did the same thing with Pinot Noir clones, which were originally planted at the Stanley Ranch in Carneros.

"Louis Martini was an innovator — a really quiet one — a quiet giant. People like him don't come along very often. From our perspective, in terms of his support for the department, we haven't had very many like him. We miss him very, very much, and we look to Mike and Carolyn, who have received their father's gift of generosity and are carrying on that tradition of working with the university and supporting the Department of Viticulture & Enology. A great man

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has passed, but his legacy lives on."

"Louis Martini was a role model for the industry — a great gentleman and a real statesman," said Karen Ross of CAWG. "He committed time and money to the industry. Louie enjoyed tremendous respect in the grower community for being a straight shooter and someone who cared about wine and the success of the industry as much as he cared about his winery. I feel very fortunate to have met this wonderful man!"

"I first met Louis Martini when I was a junior at UC Berkeley in 1938," recalled Charlie Crawford, E&J Gallo Winery. "He was probably more knowledgeable about wine than any of the rest of the students there, and he helped us with some of the practical things. He was always a very helpful person. Louis had a good palate. He was a wonderful person to work with.

"Our whole student group went into the wine industry. Four of us were charter members and are past presidents of the Society of Enology & Viticulture, and we were all past chairmen of the Wine Industry Technical Committee over the years. Louis still attended and helped us out. As recently as a year ago, he attended a meeting in Modesto going over some industry problems. Louis was a person who gave of his time freely, because he felt a responsibility to his city and to the industry and to the country. His dad had trained him well.

"Hillgard, Cruse, Bill Eddy, and Louis' father are all part of the history of the California wine industry. On the front of Hillgard Hall in Berkeley (where the department of fruit products and enology is housed), which was built before Hillgard died and was named after him, there's an inscription carved in stone above the entrance that really speaks to what the university instills in students. It says, `To rescue for human society the native values of rural life.' If that doesn't speak to Louis, I don't know what does."

"Louis Martini was quite a gentleman in all respects," recalled Peter Mondavi, Sr., president of Charles Krug Winery, St. Helena, CA. "I can't think of anyone who was so basically sound, calm, honest, friendly, and sincere throughout his whole life. Whatever challenges confronted him, he handled them in his usual calm manner, and it was unbelievable how he maintained his composure at all times.

"His love was viticulture and the production of wine, and since the quality and variety of the grapes was most important in the wine, he concentrated his first efforts in the vineyards. He was probably the first to pioneer the production of grapes in the Carneros region of Napa County, which has proven to be an outstanding area for certain varietals. Such has been his viticulture expertise throughout his life.

"He constantly worked with the UC Davis Viticulture & Enology Department, as well. Louis pioneered the production of Merlot. It took many years for the public to realize the quality of Merlot, but today it's one of the outstanding wines.

"It was not only in those fields he excelled; he was also closely associated with the California Wine Institute. There he was extremely active in regulation and laws pertaining to the wine industry, which are so important. This is truly sad because Louis will be missed by all of us."

Louis' daughter, Carolyn accepted the award from Gerald Boyd, and his wife, Elizabeth, also attended the dinner. "Thank you for this honor to my father," said Carolyn. "His family, of course, all knew what a neat guy he was. This recognition from his peers is very gratifying.

"A short word on integrity. A friend defines integrity as `the commitment to relationships.' It seems like a good working definition. I think you are on the right track with this award, and I would like to commend the Lodi wine grapegrowers for a brave undertaking. It will be interesting to see the Integrity Award evolve. I believe it should become the most important honor the industry gives itself. It might take a little time. Be patient.

"From the selection committee members that I know, it's clear that you have done a great job of finding judges who embody the idea of integrity themselves. And obviously, to make this

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award meaningful over time, it also has to embody integrity. Make a commitment to this relationship. Vote with your hearts. We are very pleased to have Dad as one of the first honorees. From the Martinis, thank you."

JOE COTTA

Joe Cotta, owner of Joe A. Cotta Vineyards in Lodi, received a LWWC regional Award of Merit. "The Lodi-Woodbridge region has enjoyed great success over the last decade, growing both in size and reputation, based on the quality and value of our winegrapes," said Mark Chandler when presenting the award. "That success can be directly attributed to the growers of the Lodi-Woodbridge region who have invested their time, energies, and resources for the common good. We have no shortage of growers willing to step up to the plate and tackle the many jobs that help sustain our quality reputation both in the field and in the marketplace.

"Joe Cotta is well-known and well-respected in the grape business and throughout the Lodi community. With soft words and strong actions, he has quietly and consistently set a standard of measure for hard work, honesty, and integrity. He is a leader by example, and his actions speak volumes about his character."

Joe and Sherry Cotta celebrate his award.

The selection committee recognized Cotta in light of his years as a dedicated and concerned champion on a variety of trade issues and because of his high level of ethical conduct.

Cotta is a native of Lodi and attended Lodi High School, where he was active in the Future Farmers of America and received his state farmer degree in 1972. He continued his studies at California State University, Fresno, where he earned a bachelor of science in viticulture with a concentration in enology in 1976.

Cotta currently owns and farms nearly 700 acres of premium winegrapes in the Lodi region, including Cabernet Sauvignon, Merlot, Chardonnay, Zinfandel, and Sauvignon Blanc. The land Cotta farms was once owned by his grandfather. He sells grapes to three of California's leading wineries, and once was a partner in a winery that pioneered the use of the Lodi appellation on its wine labels.

Cotta is assisted in the farming operation by his wife Sherry and their five children. He has been a member and treasurer of the board of directors of the Lodi Young Farmers. He has been a long-time member of the Lodi District Grape Growers Association, was treasurer for nine years, and served as president.

In his own reserved style, Cotta has been active in the LWWC since its inception in 1991. He is currently on the executive board, and the elected commissioner has also served on the LWWC research committee since 1991. "I have watched Joe sit quietly through many a debate in that committee and when he finally speaks you know his opinion is well thought out and sincere, and it commands the respect of his peers," noted Chandler.

Cotta is an active member of the Robert Mondavi Woodbridge Winery quality enhancement team. He is also a member of the Lodi Rotary Club where he was honored in 1998 with its Silent Rotarian Award. "I consider Joe Cotta to be one of the true princes of Lodi," added Chandler.

The selection panel included: Gerald Boyd, wine journalist, who chaired the panel, Dr. Richard Peterson, Folie à Deux Winery; Karen Ross, California Association of Winegrape Growers; Allen Shoup, Stimson Lane Vineyards & Estates; Simon Siegl, American Vintners Association; Bob Thompson, wine journalist; and Debie Zacheras, wine buyer, EOS Restaurant, San Francisco, CA. ■

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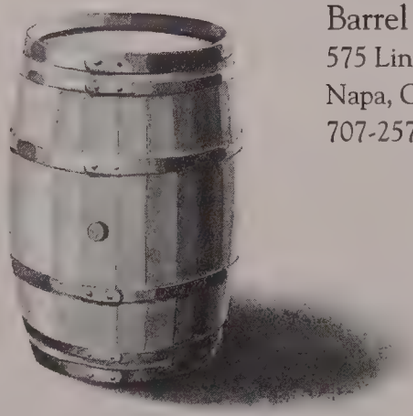

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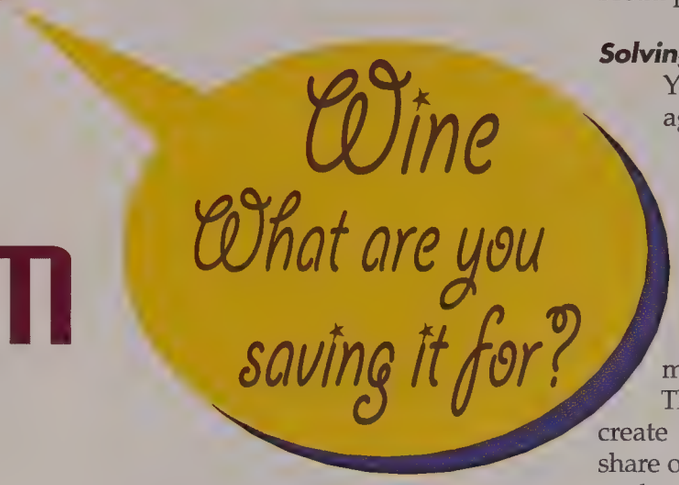
WINE MARKET COUNCIL

Solving wine's image problem



by John Gillespie

The wine industry has enjoyed modest consumption gains in the past five years, averaging about 5%, though the gain in 1997 was only 3.1%. Modest though they are, these gains are encouraging — at least until one looks beneath the surface to examine their source.

Wine Market Council's 1997 consumer survey revealed that, over the past four years, nearly all the incremental gain in wine consumption in the U.S. has come from our best customers drinking more wine. Core wine drinkers (who drink wine weekly or more often) have, over this period, increased their consumption a net 27%, while marginal wine consumers (who drink wine less often than weekly) have increased their consumption a mere 2%.

Consumer base — fragile and shrinking

When we look at the total wine drinking population of the U.S. and see that core consumers — who are 11% of U.S. adults — drink fully 88% of the wine, the fragility of our consumer base is evident.

Furthermore, both core and marginal wine consuming populations are in decline, with the core group shrinking from about 16 million to 15 million persons since 1994, and the marginal wine drinking population declining from nearly 32 million to about 26 million during the same period.

A closer look at wine drinking trends among these 26 million marginal wine drinkers raises even greater concerns. Since 1994, for every marginal wine drinker who has increased his or her wine consumption, three other marginal wine drinkers declined in consumption frequency.

Female marginal wine consumers lead this decline in wine consumption. Between 1994 and 1997, female marginal wine consumption declined a net 6%. This is especially significant since women comprise not only 60% of the marginal wine drinking population, but also 55% of the core wine drinking population.

The bottom line is that, if we as an industry fail to move the large audience of marginal wine drinkers toward core levels of consumption, there is no way that demand for wine in this country can keep up with supply.

The challenge, our research tells us, is to address two broadly held perceptions among marginal wine drinkers: Like it as they might, they consider wine to be appropriate only on special occasions, and they believe that wine makes any occasion seem formal.

In short, wine has an image problem, and image problems require image solutions. To that end, Wine Market Council has retained Bozell Worldwide in Chicago — not just to make commercials for wine — but to begin a cultural shift that will fundamentally change how wine is perceived and used among a broad population of U.S. adults.

Solving the image problem

You may know Bozell best as the agency that — over the past 12 years — has convinced American consumers that pork is the "other white meat" and has painted milk mustaches on celebrities. We believe the people at Bozell are excellent commodity thinkers and very bright marketers.

The challenge we gave them was to create a campaign that will increase share of mind for wine while simultaneously evolving the image of wine — knocking a little dust off the bottles and making wine compatible with the evermore casual daily lifestyles of millions of American consumers. The goal is to encourage regular, moderate wine consumption among a wide audience of adult marginal wine consumers.

After initially generating several dozen concepts and approaches, we went on the road with Bozell to New York, Chicago, Syracuse, Orlando, and Los Angeles, conducting many focus groups to evaluate these concepts. After evaluating the results, we embarked on an extensive round of consumer one-on-one interviews to test the effectiveness of the concepts that survived the earlier rounds.

We found that, while marginal wine consumers readily acknowledge their perception of wine as a special occasion beverage, they resist being told that they should change their view or that they are simply wrong. The most effective way to move these consumers and change their perceptions, we found, was by encouraging self-discovery through humor and a gentle nudge. So the theme or unifying slogan of our campaign is merely a straightforward question:

Wine. What are you saving it for?

The advertising plan

This question is the punchline for a series of television commercials, radio

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spots, collateral print and merchandising ads, and promotional materials that have been developed for a test market advertising campaign to be conducted in Austin, TX, and Albany, NY, from February 15 through May 16, 1999.

The advertising uses humor to challenge the notion of what constitutes a special occasion by highlighting many "borderline-absurd" special or commemorative days or events, such as National Humor Month, Art in the Park Day, and Organize Your Files Week.

We have already tested the potential of this message with more than 300 consumers in one-on-one interviews. Consumers scored the test spots very high on such attributes as "energetic," "different from other commercials," "youthful," "fun to watch," "entertaining," and "would like to see again." And 31% of them said their overall opinion of wine was greatly or somewhat improved as a result of the test spots. Sixty percent of them indicated that the message conveyed "definitely" or "probably" would encourage them to increase their wine consumption.

So now it is on to the market with this endeavor.

The strategy

Television will be the primary advertising vehicle, with four television spots running on local network affiliates and cable, and a series of seven radio ads will also be put into these markets. The ads will rotate through the 14 weeks of media. These spots will have a considerable impact on our target audiences, with a total of more than 2,000 target rating points generated during the campaign through television, and 1,600 additional points generated through radio. This is a schedule equivalent to a $20 to $25 million national campaign.

We will also support the advertising component of the campaigns with a thorough public relations effort in both markets. Working through the local broadcast and print media in Austin and Albany, we will generate wine-friendly messages encouraging our target audience to make wine part of their casual, everyday lives. These messages, emanating from a credible local press will both extend the campaign's reach and its overall impact on the market.

In addition, the campaign will reach consumers in Austin and Albany where they shop, through an extensive merchandising effort executed through the wholesale and retail tiers of the trade.

We have developed campaign point-of-sale items for both on- and off-premise use, including crew buttons, posters, floor media for grocery stores, campaign pricers and stickers for a variety of display options, and ceiling danglers for larger, free-standing displays. We have also produced and will distribute campaign slogans and logos to the retail trade in each market for retailers to incorporate into their own advertising.

All of these merchandising materials will be used in concert with, and not in place of, the merchandising materials produced and put into the market by wine brands.

Evaluating the results

Because this $1.3 million campaign represents not only a significant effort but also a significant investment on the part of wine producers, importers, growers, financial institutions, and others in our industry, we will undertake a rigorous series of research initiatives to measure the campaign's impact. There will be three measures applied: a quantitative pre- and post-campaign survey of consumers, an analysis of supermarket scan data, and direct interviews of marginal wine drinkers in the markets who are familiar with the advertising.

We will be bringing in the Wirthlin Group — one of the country's leading researchers — to conduct surveys of consumers in Austin, Albany, and two control markets both before and after the advertising runs. In all, we will compile 1,400 interviews to measure the shifts in awareness, perceptions, and attitudes of this group.

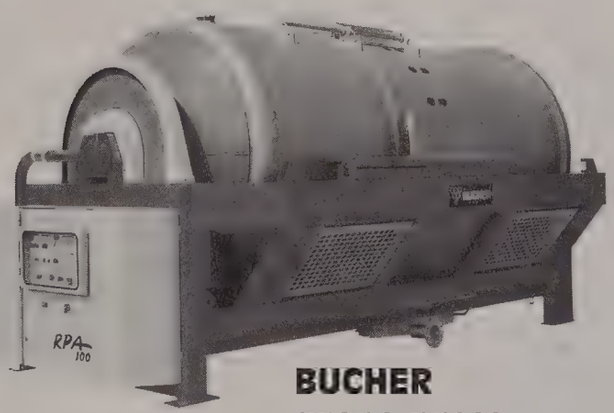
We will also work with a leading scan data provider to analyze the purchasing behavior of consumers in the test and control markets.

At the end of the campaign, we will sit down and talk in small groups with members of the target audience who have been exposed to the advertising. This will help us better understand the impact of the campaign at a personal level on those whom we most want to influence.

But at the end of the day, perhaps the truest measure of success we might earn will be the approval and enthusiasm of our peers in the markets and those observing from a distance. If the test market indeed demonstrates potential for return on investment, Wine Market Council plans to build this effort into a truly national campaign to expand the consumer base of the wine market, an effort which will require the participation and support of every tier of our industry. ■

John Gillespie is the president of the Wine Market Council, an association of wine producers, importers, grapegrowers, wholesalers, retailers, and others working to expand the consumer base of the U.S. wine market.

A WINNING COMBINATION
from vine to wine



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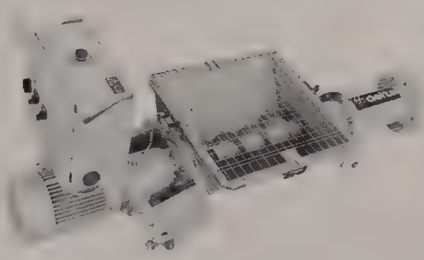

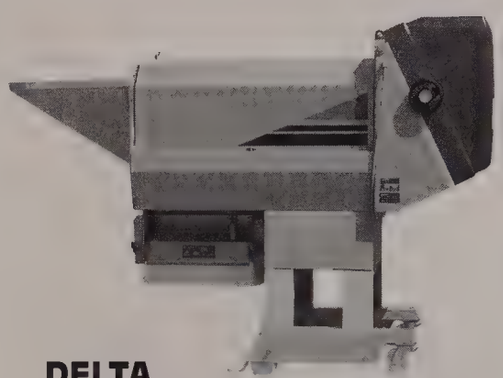

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NEW MONTEREY WINERY

KENDALL-JACKSON BOOSTS CAPACITY BY 30%

by Don Neel

Construction of a new winery south of Soledad, CA, in 1998 has increased Kendall-Jackson's production capacity to 3.7 million cases annually. The 172,500-sq.ft. Monterey County-facility has a capacity of 22,000 tons of grapes per season and is the largest of 10 Kendall-Jackson and Artisans & Estates wineries in California.

Construction and equipment cost was nearly $25 million.

The new winery is located on a 12-acre site within a 400+ acre ranch planted to Chardonnay and within 15 miles of five other ranches owned by Kendall-Jackson. These ranches total more than 2,500 acres of vineyards, which are also primarily planted to Chardonnay, with some blocks of Pinot Noir.

"During the 1998 harvest, we received more than 16,000 tons of grapes, including more than 13,630 tons of white grapes (84%) and 2,660 of red grapes (16%)," reports Jeffrey Eikenberry, general manager. "The busiest receiving day saw 865 tons." The primary grapes were Chardonnay, Pinot Noir, Riesling, and Merlot. More than 30% of the 1998 Kendall-Jackson California Vintner's Reserve Chardonnay was barrel-fermented in the new winery.

The new winery's biggest contribution is in its impact on improving wine quality by reducing travel time for the fruit from the vineyard to the winery. Capacity for Kendall-Jackson to barrel-ferment and barrel-age Chardonnay was greatly increased.

Building design

Although this is first and foremost a production facility, Kendall-Jackson wanted a visually appealing structure for the high profile site along Highway 101 in California.

Designed by Tim Woodle, AIA, project architect with Steven D. Pults, AIA, & Associates, San Luis Obispo, CA, the winery has two main structures — a tank building and a barrel building separated by a landscaped courtyard. A pedestrian bridge across the courtyard links the buildings and carries winery transfer lines and utilities. Administration, winemaker's offices, event spaces, and board rooms are contained in a highly articulated wing off the main structure. This wing offers views into the center courtyard and to the Kendall-Jackson Chardonnay vineyards beyond.

The architectural approach makes visual reference to the history and industry of Monterey County. For example, the main form of the two structures is an abstraction of the buildings of Monterey's historic Cannery Row, and they also recall nearby Soledad Mission, with its simple repetitive elements. Further architectural reference is made to traditional central California agrarian forms, such as the gables, sheds, and towers, which dot the landscape of the region.

Kendall-Jackson's winery development group completed the schematic design of the new winery, and worked closely with Pults & Associates to complete the "aesthetic" and code components of the design.

Due to the corrosive environment of wash water, humidity, and fermentation gases, wood was not used in construction of the winery. The exterior walls are a hybrid of five-foot high and eight-inch thick concrete block wainscott and a rigid wall panel system. The block wainscott provides maximum water resistance while also resisting impact loads from daily operations. The 2.5-inch thick wall panels have a factory-applied KYNAR coating over a steel skin. The panel core is rigid polyurethane, providing an R-19 insulating value. These panels are attached to pre-engineered galvanized steel sub-framing, which is the building's main structural system.

Assembled on site, the roof system is a sandwich panel of the same galvanized steel sub-deck, with three inches of rigid foam (R-23 insulating value) inside and a baked enamel metal roof outside.

One benefit of the pre-engineered

Above: Kendall-Jackson winery, designed by Pults & Associates, tank cellar on left and barrel building on right.

Right: With more than 2,500 acres in Monterey County, Kendall-Jackson has a strong interest in mechanical harvesting. Two self-propelled Braud mechanical harvesters were bought for use in Monterey County vineyards in 1996, one in 1997, and two more in 1998. K-J staff built two attachments, a cane-cutting attachment and an over-the-row directional sprayer. Spraying four vine rows at once, the sprayer has air assist and a 1,200-gallon capacity tank.

The attachments can be used in place of the bow rod harvester head on each chassis, and they can be run in combination or individually. The first attachments were used in the 1997 growing season. Attachments for the third machine were used in 1998, and the fourth and fifth set of sprayer and cane-cutting attachments will be ready for the 1999 season.

Harvesting speeds are between 2.2 mph and 3 mph in the 8x6 spaced Chardonnay vineyards with a vertical shoot-positioned trellis. Hedging and spraying speed through the vineyards is 4 mph. Mechanical pre-pruning with the Braud machines is planned to begin prior to the 1999 crop year.

metal rigid-frame technology is its ability to adjust to tank layouts and long-beam span. This system minimized the number of interior columns in the tank room and virtually eliminated them in the 200-ft. x 500-ft. (100,000 sq.ft.) barrel building, which can hold up to 45,000 barrels.

The concrete floor in the barrel building pitches from ⅛-inch per foot in the barrel work area to allow quick flow of wash-down water, to ¹⁄₁₆-inch per foot in the barrel cellar area.

In the tank building, aisles between tanks range from 10 to 12 feet in width. The center of all aisles is the high point with a slope back to trench draining at the front of the tanks. Tanks are set on concrete pads at 32 to 36 inches above the floor to allow the use of pumpover sumps and for ease of tank cleaning.

There are 10 banks of tanks in the tank cellar. Four banks have two-door red/white fermentors: 3,600-, 7,800-, and 13,500-gallon closed top tanks. White wine tanks are 6,300-gal, 12,600-gal, or 18,900-gal. A CO_2 removal system, including three zone sensors and 20 motorized fan louvers with a central control, was installed by IRAPP (Industrial Refrigeration & Process Piping, Healdsburg, CA).

Press pad

The winery's two receiving hoppers can receive two trucks independently, and there is room to add a third receiving hopper. Each receiving hopper has a 24-inch variable-pitch screw conveyor with flight edging and a four-foot long, wedge-wire draining screen in the trough to divert free-run juice from the presses.

One of the design goals for the new winery was to compare juice quality from whole cluster and mechanically-harvested grapes delivered by a screw conveyor feed and by a belt-conveyor feed to the presses.

The screw conveyor system consists of a 24-inch horizontal screw conveyor (operating at 30RPM), which carries grapes from the receiving pit to the Delta E8 destemmer or to a 24-inch incline screw conveyor (operating at 43RPM). The incline screw conveyor delivers to a 24-inch horizontal reversible screw conveyor which feeds two presses (operating at 47RPM). This system was built by Ogletree's, St. Helena, CA. Ogletree's also installed screw conveyors to remove pomace from the press area.

Kendall-Jackson winery staff have decided to install a second belt conveyor system (see Figure 1), which will deliver grapes from the third receiving pit to presses to be installed in the future.

Six presses from KLR Machines, Inc., Sebastopol, CA, include five Bucher RPA-320 (3,200HL) two-door tank

The 1,800 sq.ft. laboratory has 180 linear feet of counter space.

LEFT: The 100,000-sq.ft. barrel building, with a capacity of 45,000 barrels, has five platform temperature zones, each with two centrifugal, heating/cooling units provided by IRAPP, Healdsburg, CA. The system has a CO_2 gas monitoring and control system and incorporates night air cooling. Each platform unit has an air filtering system with two-speed fan motors for maximum efficiency.

Installed by Mee Industries, Inc., Monrovia, CA, the Mee Fog system in the barrel building maintains a high-humidity environment that reduces topping by 80%. The system has been designed to accommodate the specified air transfer and aspects of the building design, such as the sloping ceiling with a 24-ft average height.

Operating at 1,000 psi with 350 SJ-7 nozzles (7 lbs of water per hour per nozzle), the fog system includes a controller to keep the humidity at the desired set point and a water treatment system to ensure high efficiency and low maintenance.

Using only 4hp to operate, it runs less than 20% of the time, depending on how much door opening and closing occurs in a day; power consumption is less than 10% of what a spinning disk-type humidifier would require.

Mee Industries not only installed the system, but also trained the on-site maintenance staff in correct operation during "Fog School." The Mee Industries installation manager worked closely with the general contractor, Wright Contracting, to complete the installation. In total, Kendall-Jackson has 12 winery buildings using the Mee Fog system.

presses for white grapes and one Bucher RPA-150 tank press for fermented red skins. Ultimately, the press pad will have 10 presses. The truck ramp is 14 feet above the press floor.

Additional equipment in the tank cellar includes two Alfa-Laval solids-ejecting disc stack centrifuges (capacity: 3,000 gallons/hour) and a 1,020-sq.ft., 62-plate Quadra Press lees filter.

"Our efforts are a synergy of proven Old World winemaking practices and modern technology focused to make outstanding wine at a scale of production unheard of 10 years ago," says Steve VonRaesfeld, Kendall-Jackson staff architect. "The Kendall-Jackson winemaking group should be com-

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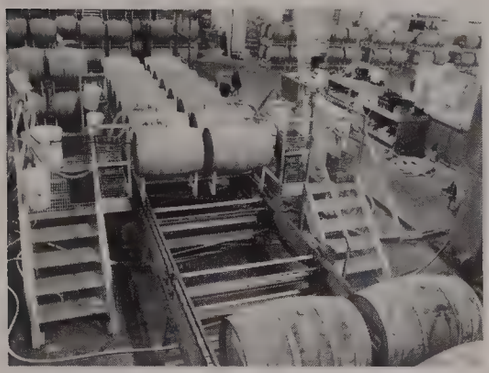


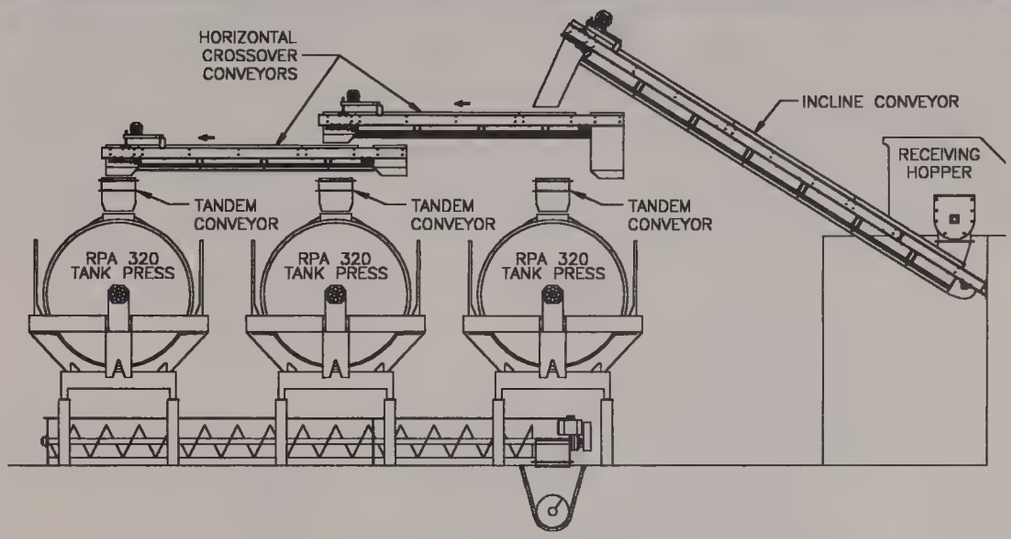
The barrel-filling conveyor, in the 15,000-sq.ft. barrel process area, was built by the Tom Beard Co., Healdsburg, CA, with a capacity of eight four-barrel pallets. In one 24-hour day, two 12-hour work crews filled 4,391 barrels with Chardonnay juice at 50°F that was just beginning primary fermentation. The programmed flow-control system filled four barrels in 60 seconds with 52 gallons per barrel.

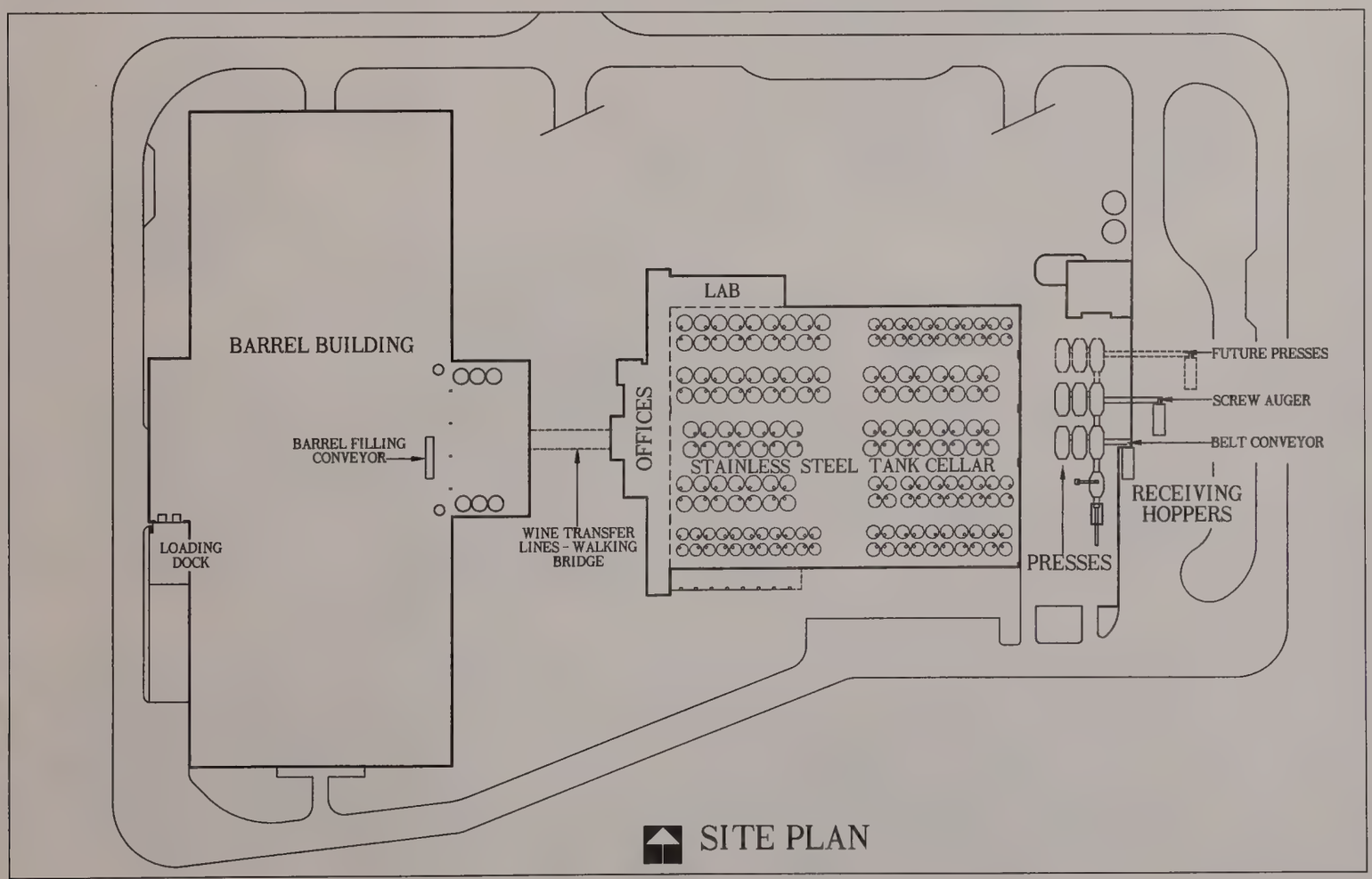
mended for pushing our construction group to use processes and technologies previously reserved for small ultra-premium wineries. The challenge is to use them on an order of magnitude five to 10 times what smaller wineries have done. I believe we are not only successful, but also our scale offers efficiencies and qualities that the smaller wineries don't have."

Figure 1

The Westec Equipment Division of the Alary Corporation designed and installed three belt-conveyor systems in the new Kendall-Jackson Monterey winery. One belt system can deliver 350 tons of grapes per hour to three tank presses. This system includes a cleated incline belt from the receiving pit, a horizontal flat-belt shuttle conveyor (adjustable to any press), and a tandem belt above each press to feed two loading doors of each press simultaneously. The design of the conveyor housing is such that the cleated belt conveyor is situated at least eight inches below the top of the containment or conveyor housing. This system has a variable speed option.

Westec also installed a cleated horizontal conveyor to deliver stems from the destemmer to a discharge auger and a portable incline cleated conveyor belt with hopper to load fermented red grapes to a tank press.





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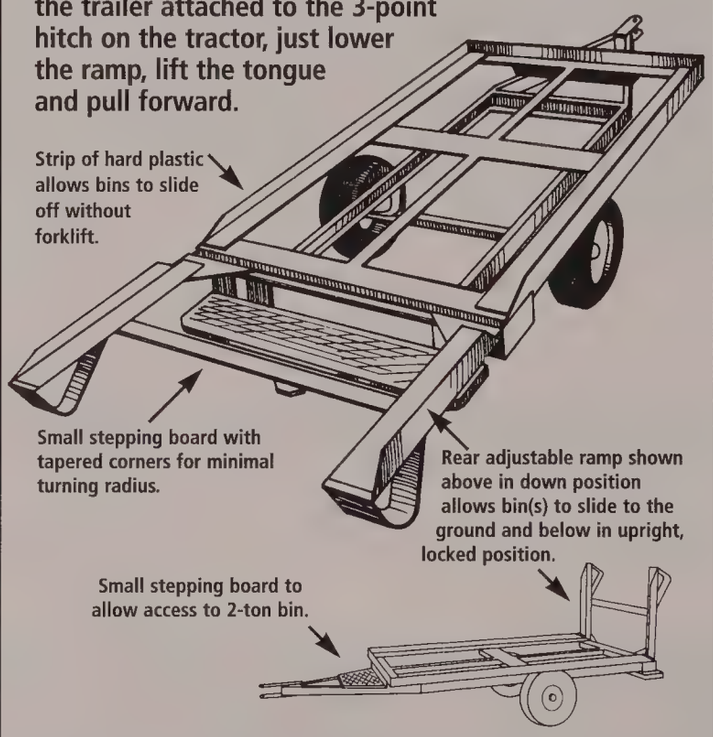
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Winemaking

The largest winemaking activity in the new winery is barrel fermentation of Chardonnay. Chardonnay grapes are pressed, then the juice is settled and racked and inoculated with yeast. When yeast activity occurs, the juice is transferred to barrels. About 20% of the barrels are inoculated with malolactic bacteria. Wine from the ML-inoculated barrels is used to top barrels that have completed primary fermentation, thereby inoculating all barrels to complete malolactic fermentation. All barrels remain *sur lie* until racking off the yeast lees for blending and bottling.

Bottling

For the near future, all wine from the Monterey winery will be transferred by tanker to a Kendall-Jackson bottling facility in Santa Rosa, CA, for bottling.

Refrigeration

The temperature control system was designed by IRAPP to meet Kendall-Jackson's production requirements safely and efficiently. In the tank building, 180 multiple jacketed stainless steel wine tanks handle a production of 1,375 tons of grapes per day. Two IRAPP juice chillers on the press pad can cool 100 gallons of juice from 80°F to 55°F per minute.

One central, computer-controlled mechanical room with three screw compressors has a capacity of 1,071 tons of refrigeration with two welded plate-and-frame glycol chillers. The system uses a low-charge, environmentally friendly ammonia refrigerant. The monitored ammonia system is completely contained in the mechanical area; only glycol enters the tank building.

Two 450-ft. long, 12-inch diameter, specially insulated, stainless-steel lines deliver cold glycol underground to the 180 jacketed wine tanks and juice chillers. The tanks also have a glycol-jacketed warming system.

Process wastewater

In the process wastewater management system designed by Summit Engineering (Santa Rosa, CA), gravity conveys process wastewater (PW) from the winery and barrel storage facility to two pumping stations with an average flow of 41,500 gallons per day (gpd) and peak crush flow of 172,000 gpd.

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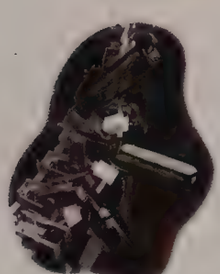

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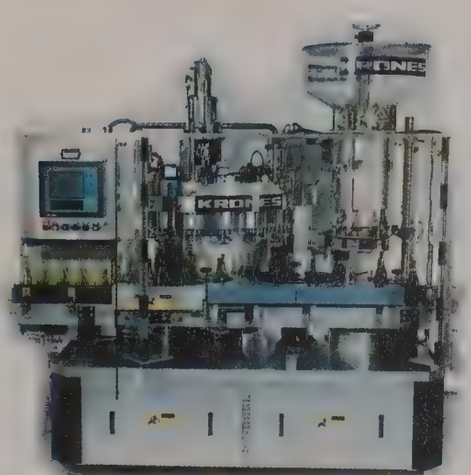

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The barrel building PW sump is 17 feet deep and has two, 10hp, self-priming pumps. When necessary, PW can be pumped from this sump to a pretreatment area for screening to remove solids, otherwise, the wastewater is pumped directly to pond #1 of the winery's aerated lagoon system.

Wastewater from the winery and crush area collects first in PW sump #1 (15.5-ft deep) and is pumped by a single 7.5hp, self-priming pump through a rotary drum screen built by P&L Specialties (Sebastopol, CA). Here, solids are removed by a rotating screen with .027-inch perforations. This process reduces the biological loading and the accumulation of solids in the aerated lagoon system.

Screened PW from the rotary drum screen flows into PW sump #2 (14.5-ft. deep) and from there is pumped to pond #1 of the aerated lagoon system. Flow rate and total flows are measured by an electronic flowmeter.

Biological stabilization of the winery's PW occurs in the aerated lagoon system, a two-pond, facultative system. Storage is available for a minimum residence time of 60 days at peak flow conditions.

Pond #1 has a capacity of 4.43 million gallons. Four 25hp floating mechanical aerators satisfy the projected biochemical oxygen demand (BOD) and oxygen dispersion requirements. PW flows by gravity to pond #2. In pond #2 (2.41 million gallon capacity), final aeration and treatment are provided by two 7.5hp floating aerators.

All of the treated PW from pond #2 is used for irrigation of Kendall-Jackson's vineyards on the same site.

Raising the quality bar

According to Randy Ullom, winemaster for Kendall-Jackson, improvements in Kendall-Jackson's vineyards coupled with the new winery will have a significant impact on the company's wines, particularly the Vintner's Reserve Chardonnay. He believes the combination is a dream come true for a winemaker and good news for consumers, too.

"Over the past few years, we've done a major replanting and expansion of our vineyards in Monterey County, planting every conceivable combination of rootstock, clone, and soil profile for producing outstanding Chardonnay. All this is within hailing distance of our new winery, giving us much more control and flexibility in deciding when to harvest, knowing that we have only a short distance to go to a state-of-the-art facility.

"We're no longer doing small scale experiments to find the best blends for our Vintner's Reserve Chardonnay. No five gallon experiments here, but 5,000- to 20,000-gallon experiments, and this facility allows us to keep all these many lots separate. This is fantastic from the winemaker's point of view. Plus, our barrel fermentation building is beyond state of the art. This allows us to continue raising the quality bar for Vintner's Reserve Chardonnay — and it's something that wine drinkers will appreciate." ■

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WINE INDUSTRY ECONOMIC PITFALLS

PART V

Inordinate use of debt

by George Schofield

Debt is like fat in a diet. It tastes good initially, but inordinate amounts can cause real health problems. For some people, even moderate amounts can be precarious, particularly for those with certain genetic propensities. Temperance and discipline are the keys to beneficial use and results.

Background

The wine business, including vineyards, is one of the most capital-intensive industries in the world, often requiring more than $3 of assets to generate $1 of sales revenue. In the face of such need for capital, it is often hard to resist the lure of borrowing as opposed to paying the costs of more permanent equity financing. The discipline of avoiding debt often requires foregoing opportunities or accepting shared ownership, with the related implications of dilution, new participants, and possible control issues.

Early problems of new wineries

In the formative years of a new winery, the profits, if there are any, generally produce a meager return on sales. For a new winery, anything near a 5% rate of earnings before interest and taxes (EBIT) to total sales during the first five years ought to be considered a success. With a 3:1 relationship of assets to sales dollars, the return on assets frequently is in the range of 1% to 2%.

To borrow money at an annual cost of 8% to 10% to provide an immediate 1% to 2% return can be very risky. At best, equity owners will be using their own equity return to subsidize the return to lenders. If too much is borrowed, the business could enter a downward spiral of more borrowing to cover current debt services, which creates a worse situation the next year.

Fledgling operations, especially a capital intensive one, such as a winery, must avoid the risk of inflexible annual debt servicing requirements (interest and principal payments). In the formative years of a business, there are too many higher priorities and problems. In addition to normal start-up costs, a new winery usually has little ability to price its wines appropriately relative to quality. Whether the winery discounts in the form of "promotional allowances" or simply under-prices established competition, the effect is lower revenues.

In the beginning years, it may also be necessary for a new winery to spend an exorbitant amount on selling and marketing efforts. Brand building — involving traveling to distant markets, tastings, promotions, special events, and courting media — can raise selling and marketing expenditures as a percentage of sales dollars to levels at least twice that of mature competitors' more "normal" levels. Any hope for early profits is often eliminated.

Perhaps the argument could and should be made that initial market building and brand building costs should be treated as "investments" rather than expenses. When current expenses have significant future benefits, at least from a classical economic viewpoint, the expenditure of resources *would* be considered an investment. However, the conservative nature of CPAs and bankers dictate that these be treated as expenses. Regardless of real profitability issues, the cash flow implications are severe.

Predictability of cash flow

Certainly, the predictability of available cash flow to service mandatory debt servicing is a crucial factor. With a rapidly growing winery, the lack of dependability of funds — as a result of optimistic sales plans and delayed collections from distant wholesale businesses — can cause an unexpected shortage of funds. However, the schedule of debt service payments is usually fixed and binding. Moreover, the costs of default in mandatory interest and principal debt payments can be very significant in dollars and to the reputation of any business.

Agricultural risks

Financial risks are also compounded by the agricultural nature of the industry. Larger than expected grape crops, higher prices, and the once per year production cycle make it difficult to control inventories. Managing inventory investment, particularly for red wines with ageing periods extending over two harvests, is a real challenge. Eliminating, or at least reducing, the financial risks associated with meeting requisite debt obligations, greatly facilitates bearing the agricultural risks and reduces the overall exposure of the business.

Inventory ageing

Another adverse financing factor troublesome to emerging wineries is the long cycle of inventory turnover. Premium white wines generally are released eight months to one year after crushing and not completely sold for another year. Premium red wine often requires six to 18 months additional ageing.

While some consumer product industries have three-month cycles, wineries often average two-year inventory cycles. As a result, wineries with aggressive sales growth plans generally plow back into inventory investment any meager profits the winery is fortunate enough to generate. Often those with annual sales volume growth in excess of 5% will be forced to seek new financing by debt or equity just to cover the cost of additional inventory requirements.

Whether as a result of agricultural variations or simply the long cycle, wineries can be tempted to take advantage of the collateral value of long

inventories. Through asset-based lending under a collateral formula, financial institutions can justify extending credit on the basis of a favorable loan-to-value (of assets) ratio.

Before taking advantage of such easy money, however, a prudent winery will test its ability to cover any related new interest charges through projected income. A "coverage ratio," as determined by dividing total interest expense into EBIT, is one measure of debt capacity ($1.05 of EBIT per $1 of interest expense is a normal absolute minimum).

Occasionally, rather than incur the debt, wineries will be better off to sell excess wine inventory in the bulk wine market and avoid the carrying costs (interest, storage, and insurance). When it is better to sell, the earliest bulk sale can be the best, especially in a declining market. A few wineries have subsequently found themselves in declining markets where the wines that collateralize the loans could not be sold at prices sufficient to cover loan repayment.

Establishing profitability

Emerging operations in the wine business, both wineries and vineyards, frequently have a difficult time establishing a successful sales base and especially a meaningful level of profits. A seven- to 10-year period is often required before consistent and significant profitability can be achieved.

Table I illustrates a hypothetical winery that probably went through a long period of financial struggle to achieve break-even status, which is shown as Year 1. With sales now at 10,000 cases and $1 million, the winery is poised to grow by doubling growth over a four-year period. With prices below other wines of similar quality, low production volume causing inefficiencies, relatively high selling expense, and administrative expenses disproportional to sales, the transition to meaningful operating profitability (EBIT) would be a gradual one. Without any interest expense (all equity financing), EBIT would rise from zero to $280,000 over the five years.

Debt leverage

The perils of debt financing can be seen in Table II, which superimposes the effects of 50% debt financing on the hypothetical winery. Adding interest payments changes the first year from a break-even to a loss and eliminates any profitability over the next three years. Only in the last year is the business able to bear the interest charges.

Debt risk

The slippery slope of debt is precarious. The peril to be avoided at all costs is that of borrowing **more** as the only means of covering current interest expense. Borrowing creates more debt and higher interest the following year. The cycle is then repeated. The winery or vineyard operation that does this for a number of years digs a pit of debt from which it may not be able to emerge, at least with any equity preserved. If unchecked, the cycle of increasing debt to finance operating deficits ultimately leads to a radical recapitalization of ownership interests or worse, a bankruptcy proceeding.

Growth versus cash flow

Generally, only when a winery flattens out its sales growth is it able to generate any significant positive cash flow. Even if making a modest profit, significant sales growth normally

Table I
Pro-Forma Projections

($000)	Year 1	Year 2	Year 3	Year 4	Year 5
Cases sold	10,000	12,000	15,000	18,000	20,000
($ / case)					
Selling price	$100	$100	$100	$100	$100
Wine cost	- 60	- 59	- 58	- 57	- 56
Gross profit	**$40**	**$41**	**$42**	**$43**	**$44**
Gross profit %	40%	41%	42%	43%	44%
Selling & marketing expenses	30%	30%	30%	30%	25%
($000)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Sales	$1,000	$1,200	$1,500	$1,800	$2,000
Wine cost	- 600	- 708	- 870	- 1,026	- 1,120
Gross profit	**$400**	**$492**	**$630**	**$774**	**$880**
Selling & marketing expenses	- $300	- $360	- $450	- $540	- $500
General & administrative expenses	- 100	- 100	- 100	- 100	- 100
Earnings before interest and taxes (EBIT)	**$0**	**$32**	**$80**	**$134**	**$280**

Table II
Pro-Forma Projections

($000)	Year 1	Year 2	Year 3	Year 4	Year 5
Earnings before interest and taxes(EBIT)	$0	$32	$80	$134	$280
Interest expense	-$113	-$136	-$161	-$181	-$196
Earnings before taxes	-$113	-$104	-$81	-$47	-$84
Interest coverage ratio					
EBIT + Interest	**None**	**0.24**	**0.50**	**0.74**	**1.43**

requires additional investment in inventory, cooperage, and facilities — often at a ratio of $2 of investment for each new $1 of sales.

Reported "income" becomes "paper profits" because of the required reinvestment, and distributions/returns to owners become a distant mirage. Supplemental borrowing in this scenario is often needed to cover an "investment" shortfall. Although better than a situation involving increasing debt to cover an operating deficit, the effects can be a problem to manage. At some point, a new infusion of equity funding may be a more prudent alternative.

Table III illustrates the benefits of a "breather" period. Beginning with the fifth year in Table I, the Table III addresses the next four-year period, during which volume growth stops and profits and cash flow catch up.

As revenues grow via "price," profit margins improve. Not having to push additional product through distribution channels also facilitates a reduction in promotion and selling expense to more normal competitive levels. This results in a doubling of EBIT, from the $280,000 in Year 5 to $560,000 in Year 7, and moderate growth thereafter.

Table III
Pro-Forma Projections

($000)	Year 5	Year 6	Year 7	Year 8	Year 9
Cases sold	20,000	20,000	20,000	20,000	20,000
($ / case)					
Selling price	$100	$105	$110	$115	$120
Wine cost	- 56	- 55	- 55	- 58	- 60
Gross profit	**$44**	**$50**	**$55**	**$57**	**$60**
Gross profit %	44%	48%	50%	50%	50%
Selling & marketing expenses	25%	20%	20%	20%	20%
($000)	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**
Sales	$2,000	$2,100	$2,200	$2,300	$2,400
Wine cost	- 1,120	-1,100	- 1,100	- 1,150	- 1,200
Gross profit	**$880**	**$1,000**	**$1,100**	**$1,150**	**$1,200**
Selling & marketing expenses	- $500	- $420	- $440	- $460	- $480
General & administrative expenses	- 100	- 100	- 100	- 100	- 100
Earnings before interest and taxes (EBIT)	**$280**	**$480**	**$560**	**$590**	**$620**

Table IV
Pro-Forma Projections

($000)	Year 5	Year 6	Year 7	Year 8	Year 9
Earnings before interest and taxes(EBIT)	$280	$480	$560	$590	$620
Interest expense	-$196	-$198	-$198	-$198	-$198
Earnings before taxes	$84	$282	$362	$392	$422
Interest coverage ratio					
EBIT + Interest	**1.43**	**2.42**	**2.83**	**2.98**	**3.13**

Impact on debt capacity

Stabilization of the build-up in wine inventory also eliminates the need to reinvest all, or more than all, earnings in inventory. Accordingly, the need to borrow more, at least for working capital purposes, ceases.

Table IV demonstrates the related improvement not only in overall financial health as measured by "earnings before taxes," but also in "debt capacity." Rather than the deficient coverage ratios below 1.00 in Table II, the Years 5 through 9 depict a business well able to support the financing burden of additional debt. Normally, most financial institutions will consider any business with a historical or pro-forma interest coverage ratio of 2.00 to be an excellent credit applicant.

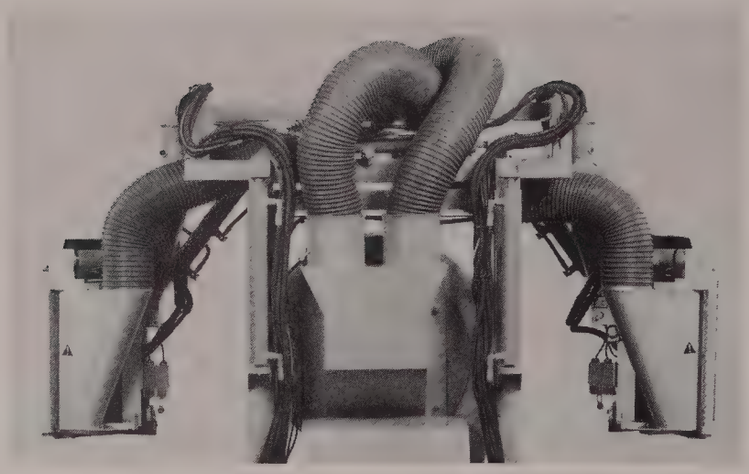
Reversal of need and availability of credit

Ironically, Tables II and IV point out a phenomenon of business life that is especially true in the wine industry because of huge capital requirements. In early and/or rapid growth periods of a business, when capital needs are greatest, the business can least afford and is least likely to be able to obtain debt financing. As a business matures, its growth in sales and inventory flattens. As the need for debt financing normally decreases, coincidentally, it generally becomes a far more attractive borrower to financial institutions.

Tables II and IV also show the obvious advantage for a winery of periodical respites from continuous expansion. During such intervals, the winery can demonstrate its latent profitability and restore its debt capacity. Although obviously beneficial, such interludes rarely occur.

Preserving debt as an option

One major precept for managing financing is to keep all options viable. Maintaining the flexibility to borrow more is critical. If a company borrows to the hilt, its next financing will have to be equity. Forced equity financing or equity financing in a poor money market are often catastrophic experiences. In such situations, cash is king, and the equity source will dictate the terms. A far better alternative is to have sufficient reserve debt capacity and flexibility to use debt financing only as an



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emergency reserve.

Besides being a reserve for unanticipated pitfalls, reserve debt capacity can be a useful and positive attribute as a contingency fund to take advantage of opportunities. An attractive bulk wine purchase, special purchases of used or new equipment, or the financing or acquisition of another vineyard or winery can all be opportunistic applications of unused debt capacity. In these situations, the timeliness of essentially preapproved debt sources can be much better than attempting to raise equity on short notice. Nevertheless, subsequent equity financing to recoup some debt capacity is usually prudent so as to restore future flexibility.

Guidelines for using debt successfully

1. Initially capitalize the venture with more equity than debt. Ideally have $2 of equity for each $1 of debt, and at a maximum have $1 of debt for each $1 of equity.
2. Restrain annual sales growth, recognizing that asset growth of 2:1 (relative to sales) may be required.
3. Minimize the financing of sales and asset growth with debt when the return on the assets employed is well below the interest cost of the money borrowed.
4. Avoid exceeding a minimum projected interest expense coverage ratio of 1.05 of earnings (before interest and taxes) to interest expense. Preferably maintain a healthy buffer above the 1.05 ratio.
5. If actual interest expense coverage falls below the 1.00 level, annually raise sufficient new equity to at least offset the deficit and to cover fully any loss before taxes.
6. Avoid the pit at the end of the slippery slope of debt by not borrowing money to cover interest expense. Never do so in consecutive years.
7. Allow for respite periods of relatively flat sales volume growth in order to recoup debt capacity and demonstrate earnings potential of the winery.
8. Keep some debt capacity in reserve.
9. If debt capacity is exhausted, at the earliest practical time, restore it through equity financing.
10. When the winery has matured in terms of available collateral, favorable

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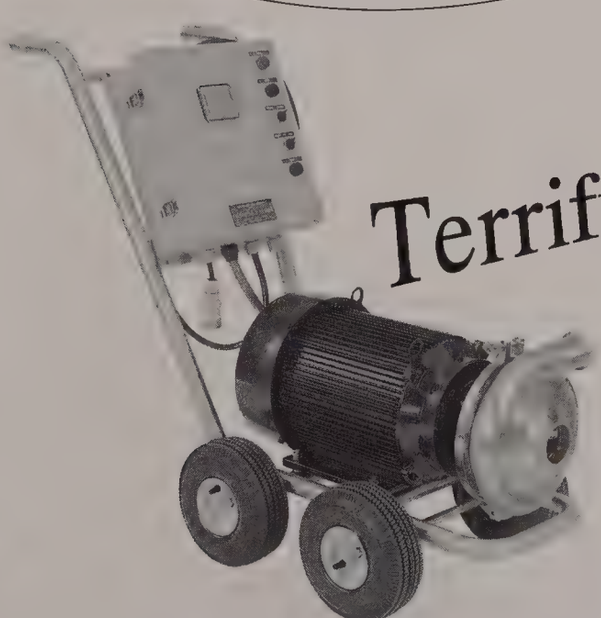

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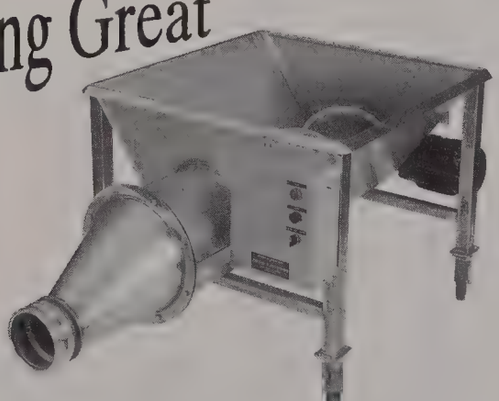

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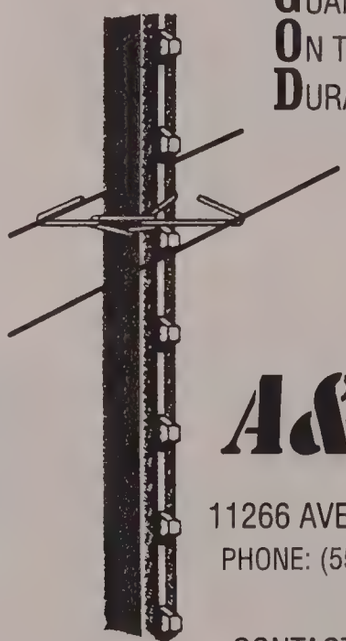

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interest coverage ratio, and an attractive return on assets, consider increasing the use of debt to a maximum ratio of $2 of debt per each $1 of equity. The funds generated by the additional borrowing can be used for:

a. Return of capital to investors (substitution of debt for equity).
b. Renewed sales growth.
c. Purchase of assets (e.g., vineyards).
d. Facility expansion.
e. Means of facilitating merger/acquisition.

Conclusion

The benefits and ease of availability of debt make it attractive. The wine industry is vulnerable to the lure of excess debt utilization because of its inherent nature and especially its capital intensity. Debt capacity should be used judiciously and prudently.

The benefit of borrowing is reducing equity funding and especially any related ownership dilution. This works well as long as the business can invest the borrowed funds at an incremental return on assets above the cost of debt. The difference is referred to as leverage, because it accrues to the benefit of the equity holders and raises their return without raising their investment.

The trouble with debt leverage occurs when the cost of debt exceeds the incremental return on assets. Equity holders then have to make up the difference by diverting their return to the lenders. If an equity holder is unable to do so, a significant change or dilution in equity ownership may occur. This contingency is characterized as "risk."

Equity financing, although more costly in many ways, is often the better and safer financing alternative, particularly in the early formative years. The traditional practice of initially financing a new winery or vineyard with maximum debt is fraught with risk.

The aggressive use of debt to leverage equity returns does frequently make sense. However, in the wine industry this is most appropriate when the business has matured. Those who avoid the excessive use of debt will sleep better, have a higher probability of success and survival, and will likely, in the long-term, earn a higher rate of return. ■

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Assessing California vineyard investments

by Tony Correia,
Correia-Xavier Inc., Fresno, CA

Suppose we have a sizable amount of cash to invest in California winegrape vineyards. What do we need to know and how should we analyze the available information to make the best investment?

Investment objectives are usually quite simple: Investors seek the highest return possible. The measure of performance for investment vehicles is typically the rate of return earned by the investment. However, rates of return, like most barometers of wealth, are complex and multi-faceted. Some are the rare jewels of true wealth, but others are only transitory, temporary illusions. Our objective as we assess investments in California vineyards is to identify the jewels.

Rates of return are typically related to the degree of assumed risk; that is, higher rates of return have higher levels of risk. The hierarchy of risk may be illustrated by observation of total rates of return earned by various investment vehicles over time. The highest rates, of course, are earned from high-risk, highly speculative vehicles, such as "junk" bonds and venture capital.

In the stock market (see Table I), traditional equity investments in small cap (capitalization) stocks (small companies) earn long-term returns of approximately 18%, almost a 5% premium over the large cap stocks (large companies, which tend to be more stable over time). The lowest levels of returns and of risk occur in treasury bonds, at roughly 4% to 6% return. Treasury bond returns come almost entirely from income and can be used as a benchmark for "safe" rates, with increasing risks accumulating from this point.[1]

Investments in agricultural land, particularly in West Coast permanent plantings (vineyards and orchards), fall in the mid-range of risk and earnings, somewhere between corporate bonds and large cap stocks, reflecting the general perception of asset stability typically associated with land. California's premium coastal vineyards have proven to be excellent investments for those who have held such assets in recent history. Examining average vineyard values over the years prior to the televising of the "French Paradox" reveals an annualized rate of increase in value at 9.6% .[2]

While every investment arena has its tales of woe and stories of small fortunes made (usually, from large ones), for the most part, coastal wine vineyard assets have performed well, both in terms of income and growth. Income in recent years has been excellent, while 1997 can only be described as spectacular. California vineyard values have also grown at stellar rates, with the true premium areas and some emerging areas experiencing Silicon Valley–type growth. Prices of Central Coast vineyards in the early 1990s, for example, were around $6,000 an acre, while sales in 1998 have been in the range of $20,000 per acre.[3]

Investments of declining value

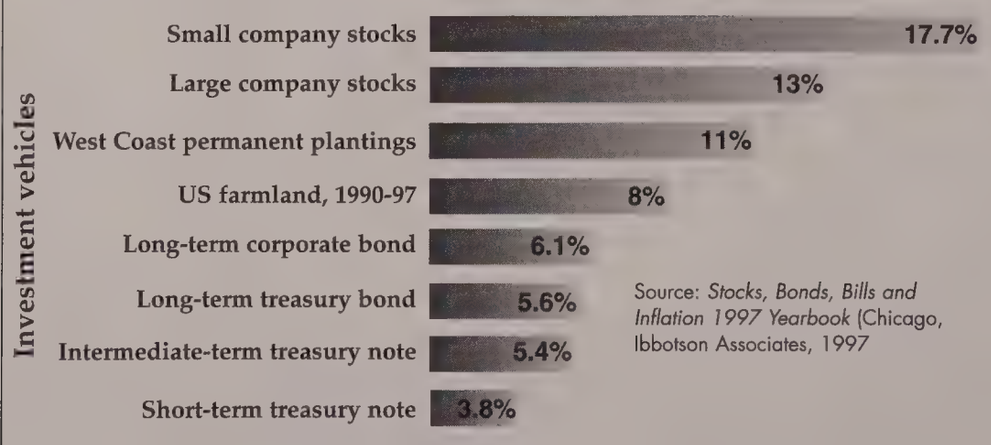
The observed rates of return imply only return "on" the investment, as investors generally assume the total return "of" the investment at the end of the holding period. But if we believe the investment may actually lose value during the holding period, as is the case with some vineyards, we will want to recapture that lost value within the period. If we feel our investment will lose half (50%) its value within a 10-year holding period, we will want to recapture that 50% within that 10-year period, so we will require 5% per year as return "of" our investment, as well as a healthy return "on" the investment.

For example, we are considering the acquisition of an older vineyard, which is afflicted with phylloxera and in obvious decline. After consulting with viticulturists, agronomists, and vineyard managers, we establish some basic assumptions about the investment (see Table II).

We project vineyard production will be 4.2 tons per acre in the coming year, declining at a rate of 0.4 tons per year. Viticultural costs are estimated at $1,400 per acre, with harvest costs at $125 per ton and overhead at $250 per acre. The land underlying the vineyard has a base value of $21,000, and we are confident that, at a minimum, this land will continue to hold this value for the reasonably foreseeable future.

A local winery will buy the grapes at a contract price of $1,800 per ton, but only for three years, and lower prices are anticipated in subsequent years due to

TABLE I: AVERAGE LONG-TERM RETURNS PER/YEAR FROM 1926-1997



Source: *Stocks, Bonds, Bills and Inflation 1997 Yearbook* (Chicago, Ibbotson Associates, 1997

supply/demand imbalance. Clearly, profitable operation of the present vineyard will not be feasible after the third year, when expenses are projected to exceed revenues, so we must recapture the cost of the vineyard (that is, the value of the investment above the value of the land) within the first three years.

In addition, we want an 11% total rate of return on our investment. Given these assumptions, the first year's operations will net $5,385 per acre. After satisfying our target rate of return of 11%, or $2,970, there is $2,415 left available for recapture of the investment in the vineyard improvements

Based on these calculations, we offer a price of $27,000 per acre, investing $6,000 per acre above the land value for vineyard improvements that currently exist. At the end of the first year, we have a remaining balance in the vineyard improvements of $3,585 ($6,000 – $2,415). At the end of year three, our last year of viable operation, we will have recaptured the total cost of the vineyard improvements, in addition to earning our 11% targeted rate of return.

Assessing income and capital appreciation

We may also analyze rates of return on coastal vineyard investments in terms of their components, income and capital appreciation, as observed in similar investments in the marketplace. Actual rates of return on investment-grade farmland properties across the U.S. have been reported at approximately 8.0% over the past seven years. These earnings have been generated primarily from annual income, with only ±30% earned from capital appreciation of assets. In the same period, rates on West Coast permanent planting properties have averaged just under 11%, with capital appreciation contributing only ±20% of total return.[3]

In the late 1980s, however, these types of properties suffered huge losses driven by capital depreciation. (In the Central Valley, for example, average winegrape acreage values, which were $9,770 in 1982, fell to $4,000 in 1986.[1]) Compared to current stock market returns, these returns are almost perfect inverted reflections of stock market investment returns. From 1926 to 1997, long-term total returns in large cap stocks, for example, have generated annual rates of return of approximately 13%, with more than 60% of the total return generated from capital appreciation.[1]

The dependence of stock returns upon capital appreciation hints at the inherently speculative nature of such investments, whereas the agricultural properties' reliance upon income underscores the market's perception of the underlying stability of asset values.

Our perception of the stability (or conversely, the volatility) of the value of our investment will drive the rate of return we will require. Thus in areas of the highest perceived stability, rates of return may be observed at much lower levels than in areas of higher volatility, which equate to higher risks.

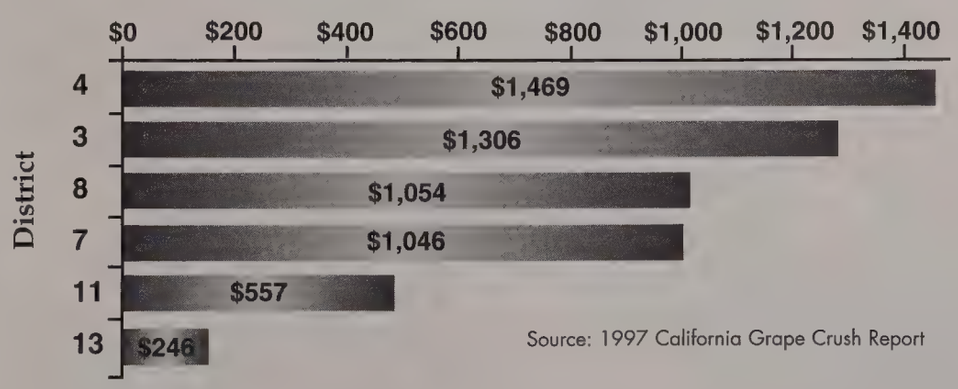
Assessing rates of return by wine region

Moving to analyses of the rates of return generated from typical vineyards in the major winegrowing areas of California, we see a broad spectrum of returns. The lowest rates, as discussed above, are seen in the areas of greatest stability and highest demand, in the Napa Valley (District 4), for example. The highest rates are observed in the "emerging markets" of the central coastal District 7 (Monterey and San Benito counties) and District 8 (Santa Barbara and San Luis Obispo counties), and the spectacularly growing Lodi-Woodbridge/Delta area of District 11. The most obvious measure of distinction between the premium

TABLE II: OLDER VINEYARD ACQUISITION @ $27,000 PER ACRE

YEAR	1	2	3	4
Yield in TPA	4.20	3.80	3.40	3.00
Price/ton	$1,800	$1,800	$1,800	$1,500
Revenue	$7,560	$6,840	$6,120	$4,500
Expenses estimate				
cultural	*$1,400*	*$1,400*	*$1,400*	*$1,400*
harvest	*$525*	*$475*	*$425*	*$375*
overhead	*$250*	*$250*	*$250*	*$250*
Total Expenses	**$2,175**	**$2,125**	**$2,075**	**$2,025**
Net operating income	$5,385	$4,715	$4,045	$2,475
Target rate of return	$2,970	$2,704	$2,483	$2,311
Available for recapture	$2,415	$2,011	$1,562	$164
Land value	$21,000	$21,000	$21,000	$21,000
Vineyard value	$6,000	$3,585	$1,574	$13
Less recapture	($2,415)	($2,011)	($1,562)	($164)
Remaining vineyard value	$3,585	$1,574	$13	($151)
Remaining asset value	$24,585	$22,574	$21,013	$20,849

TABLE III: FIVE-YEAR WEIGHTED AVERAGE GRAPE PRICE PER TON, 1993-1997



Source: 1997 California Grape Crush Report

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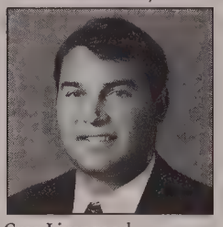
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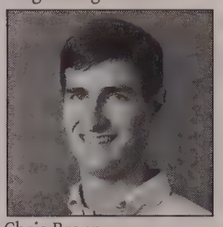
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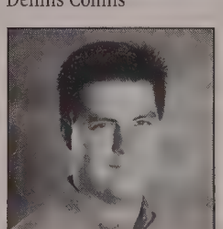
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districts is the average price per ton, as reported in the 1997 California Grape Crush Report (see Table III).

Volatility of price structure is also a major concern, and in the past 10 years, we see the greatest volatility in Districts 7, 8, and 3 (Sonoma County), with the lowest volatility in Districts 13 (primarily Fresno and Madera counties), 11, and 4, respectively. These lower rates may be deceptive, however, due to the lower unit prices in Districts 13 and 11.

While average annual grape prices in District 4 have run from a low of $809 in 1987 to a high of $1,716 in 1997 (a total increase of 112%), District 13 went from only $143 to $275 (92% increase), and District 11 from only $300 to $601 (100% increase). District 7 moved from $388 to $1,240 (219% increase). Also worthy of note is the decline in grape prices observed in District 11 in 1997, with 1997 prices 4.3% lower than prices in 1996, as district production increased by 55%.

In comparison, production in Napa Valley increased by 44%, and grape prices rose 14%.

Returns are also heavily affected by yields, the average number of tons of grapes harvested per acre. Here again, there is a broad range, with Districts 13 and 11 producing double the yields seen in the coastal areas. When reviewing such data, however, we must always keep in mind the three types of lies — lies, damn lies, and statistics.

These grape yields reflect overall district averages, including both old and new vineyards, and are skewed as a result of massive replantings on phylloxera-resistant rootstock in many areas (Table IV). They do not necessarily capture the true impact of new, modern-style, higher-density plantings, which may yield much higher tonnage than reported district averages. In those areas which have experienced large-scale new plantings, such as Districts 7, 8, and 11, we may safely anticipate that these new vineyards will significantly affect average yields — and therefore rates of return — as they achieve their full productive potential.

We now have two pieces of the puzzle, grape prices and yields. Calculating average gross revenue for each respective district, we again see a broad spectrum of numbers, an almost mirror image of the above analysis; the

TABLE IV: DISTRICT VINEYARD VALUES: REVENUE

District	Tons/acre	Price/ton	Revenue/acre	Vineyard values, per survey*	Gross revenue multiplier
4	4.01	$1,469	$5,892	$34,136	5.79
3	4.70	$1,306	$6,136	$28,457	4.64
8	4.74	$1,054	$4,989	$17,333	3.47
7	4.81	$1,046	$5,031	$17,333	3.45
11	9.97	$557	$5,554	$17,000	3.06
13	10.16	$246	$2,496	$9,000	3.61

* 1998 Vineyard Economics Seminar Survey — Table is based on the 10-year average yield per acre, as calculated from the Grape Crush Report and the Grape Acreage Report, through 1997.

TABLE V: DISTRICT VINEYARD VALUES: RESISTANT VINEYARD REVENUE

District	Tons/acre	Price/ton	Revenue/acre	Resistant vineyard values, per survey*	Gross revenue multiplier
4	5.00	$1,469	$7,346	$50,542	6.88
3	6.00	$1,306	$7,834	$41,123	5.25
8	6.00	$1,054	$6,322	$26,816	4.24
7	6.50	$1,046	$6,801	$26,816	3.94
11	9.50	$557	$5,292	$25,000	4.72
13	10.16	$246	$2,496	$12,000	4.81

* 1998 Vineyard Economics Seminar Survey

areas of lowest yields, Districts 3 and 4, generate the highest revenues due to their much higher grape prices.

Again, the data is somewhat deceptive as District 4's averages reflect massive replantings, which have occurred there in the past six years, with attendant loss in production as older vineyards were removed, replanted, and gradually regained production. The newer, modern-style, replanted vineyards are attaining much higher levels of production while still maintaining the high grape quality demanded by wineries. However, these average numbers may be used effectively for comparisons between various districts.

If we now look at vineyard prices in each of these areas, we can measure these values as mere multiples of vineyard revenue (see Table IV). As a measure of average vineyard values, we may use the values provided by the survey of attendees at the July 1998 Vineyard Economics Seminar in Napa, CA. (Values for Districts 11 and 13 were extrapolated from available data.) The survey queried attendees as to their opinions on a variety of issues, including land and vineyard values. Using the survey results for values of vines susceptible to phylloxera, we can then calculate revenue multipliers — that is, the multiple of the gross revenue per

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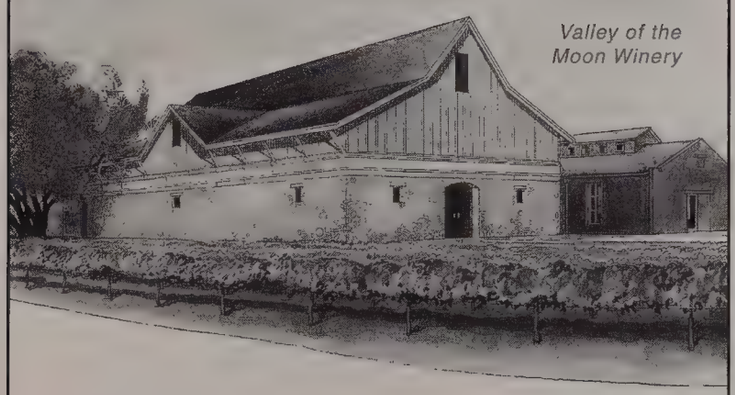

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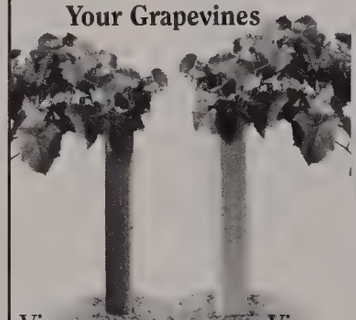

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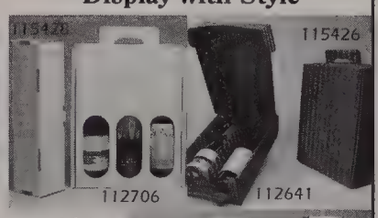

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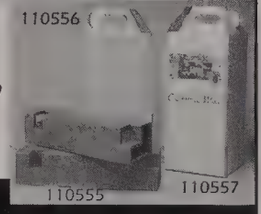

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acre that equals the value of the vineyard per acre. Once again, the market's preference for Napa Valley (District 4) is obvious. It has the highest revenue multiplier, and the value of the land is equal to almost six times its revenue.

While this may be a valid measure of an older vineyard on rootstock susceptible to phylloxera, we cannot use this data for modern-style vineyards, with their higher levels of production, anticipated long vineyard lives and production periods, and consequently higher vineyard prices. Using the survey results of prices for phylloxera-resistant vineyards and adjusting production to levels consistent with actual yields observed on such vineyards, we see a similar multiplier curve but at slightly higher levels (see Table V).

Assessing net income

The true measure of vineyard performance is net operating income; the typical measure of vineyard value is the overall direct capitalization rate, which is the ratio of income to value. Each region requires different production costs, resulting in different respective net incomes. Following the previous analysis, we first examine traditional, older-style vineyards on rootstock susceptible to phylloxera (see Table VI). Some regions with lower costs may gain performance in this analysis, but the overall pattern is familiar; Napa Valley yields the lowest rates of return, with the highest rates seen in the emerging areas of Districts 7 and 11.

Moving to the newer, modern-style vineyards on phylloxera-resistant stock (see Table VII), we see a slightly different pattern of returns, but Napa Valley still has the lowest rate, and the central coastal districts, 7 and 8, have the highest.

District 7, Monterey and San Benito counties, is at the top of the range. District 7 is unique in several regards: First, the premiere grapegrowing areas of this district have not shared in the general growth of demand for coastal homesites or other non-agricultural uses.

In the dominant grapegrowing area, the Salinas Valley, vineyards do compete for land with the opposing dominant agricultural use, vegetables, but this competition is based on an inverse

TABLE VI: DISTRICT VINEYARD VALUES: CAPITALIZATION RATE

District	Revenue/acre	Net operating income	Vineyard values, per survey*	Direct capitalization rate
4	$5,892	$3,090	$34,136	9.1%
3	$6,136	$3,649	$28,457	12.8%
8	$4,989	$2,755	$17,333	15.9%
7	$5,031	$2,942	$17,333	17.0%
11	$5,554	$3,056	$17,000	18.0%
13	$2,496	$1,089	$9,000	12.1%

* 1998 Vineyard Economics Seminar Survey — Table is based on the 10-year average yield per acre, as calculated from the Grape Crush Report and the Grape Acreage Report, through 1997.

TABLE VII: RESISTANT VINEYARD: CAPITALIZATION RATE

District	Revenue/acre	Net operating income	Resistant vineyard values, per survey*	Direct capitalization rate
4	$7,346	$4,271	$50,542	8.4%
3	$7,834	$4,934	$41,123	12.0%
8	$6,322	$3,912	$26,816	14.6%
7	$6,801	$4,511	$26,816	16.8%
11	$5,292	$2,822	$25,000	11.3%
13	$2,496	$1,064	$12,000	8.9%

* 1998 Vineyard Economics Seminar Survey

relationship. While demand for and values of vegetable land increase as one moves *north* within the Salinas Valley, the demand for and value of land for vineyard increase as one moves farther *south* in the valley. This trend is a result of the unique climate and geography of the Salinas Valley.

District 8 is distinguished from District 7 by significant demand for non-agricultural uses, such as homes, which affects local land markets significantly.

With all this information in hand, we revisit our hierarchy of risk and return analysis, this time including rates of return for modern vineyards (see Table VIII). The result is a clear picture of where California's modern vineyards stand as investments.

Bottom line

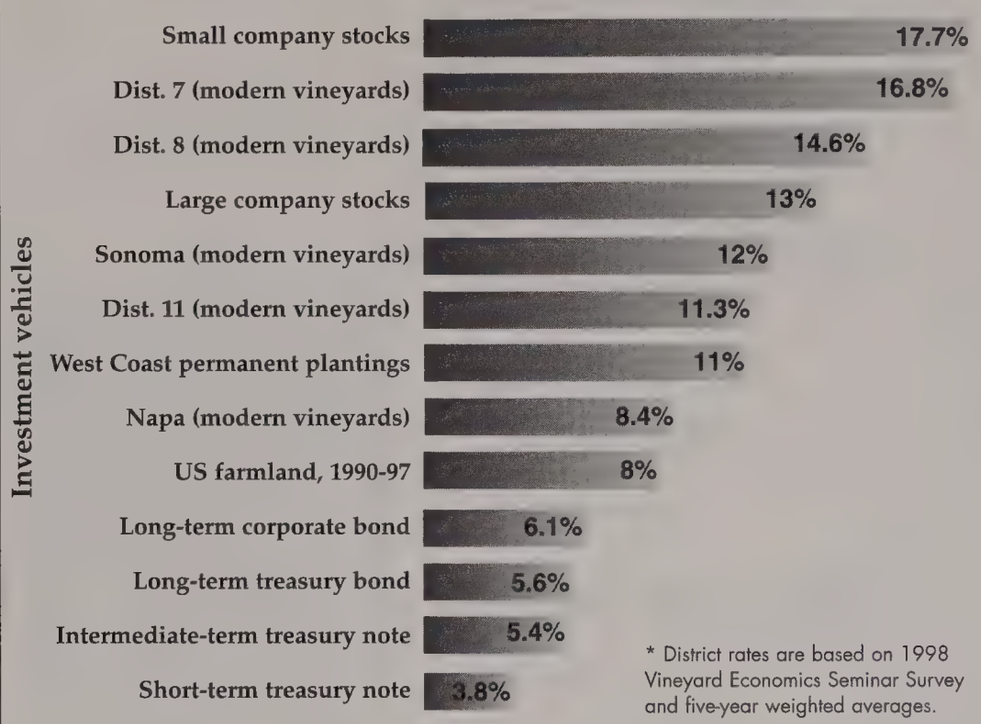
Based on the rates of return and levels of risk for California vineyards, where should we invest? Clearly, a significant portion will be earmarked for investment opportunities in Napa County (District 4), as the true "blue chip" account.

Why is Napa Valley considered a "blue chip" opportunity? Reviewing the risk/return analyses of California's premium winegrape growing areas, Napa Valley investments appear to generate the lowest level of returns. These returns are low because of the low level of risk perceived by investors in this market. In fact, Napa Valley continues to be an extraordinarily stable market, with land and vineyard values climbing steadily over the years, albeit with an occasional hiccup.

Napa Valley has clearly emerged as a world-class premiere winegrowing area, and in comparison to other such world-class sites, even the extraordinarily high vineyard values observed today may yet be seen to be bargains in the 21st century. The stability of this market is amplified by the demand for alternative uses, with homesite values adding significant incremental value. The severe geographic constraints of this area sharply limit the supply of available land, and demand is further enhanced by its physical location near the San Francisco Bay Area urban centers and the valley's considerable aesthetic attractions.

As Napa Valley wines continue to gain global stature, these values can be

TABLE VIII: AVERAGE RETURNS ON VARIOUS INVESTMENTS*


Investment vehicles
Small company stocks 17.7%
Dist. 7 (modern vineyards) 16.8%
Dist. 8 (modern vineyards) 14.6%
Large company stocks 13%
Sonoma (modern vineyards) 12%
Dist. 11 (modern vineyards) 11.3%
West Coast permanent plantings 11%
Napa (modern vineyards) 8.4%
US farmland, 1990-97 8%
Long-term corporate bond 6.1%
Long-term treasury bond 5.6%
Intermediate-term treasury note 5.4%
Short-term treasury note 3.8%

* District rates are based on 1998 Vineyard Economics Seminar Survey and five-year weighted averages.

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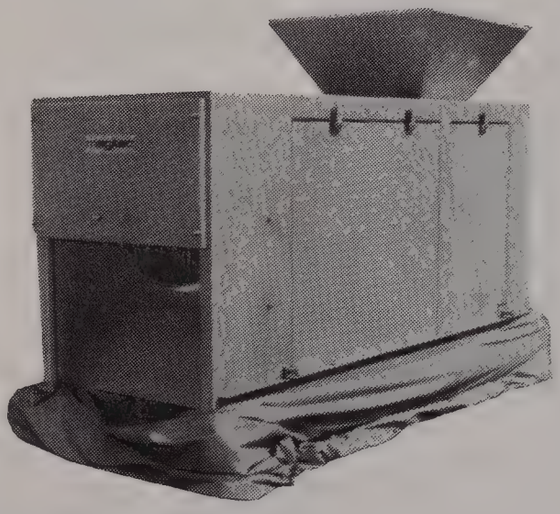

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expected to at least hold and, perhaps, to gain slowly as world demand for luxury wines continues to grow, since the areas capable of growing such wines remain severely constrained.

Sonoma County's land values rise under the same pressures felt in the Napa Valley, as vineyards compete with homesites and other non-agricultural uses. Sonoma County's many appellations are gaining recognition for high quality wines at good value, although vineyard and land values still reflect a significant increment of value less than in Napa Valley.

Sonoma County's vignerons must still deal with replanting many thousands of acres to phylloxera-resistant rootstock, and this extensive endeavor may provide targets of opportunity for clever investors. Redevelopment of older vineyards must be approached cautiously, however, as these projects can consume cash quickly, and many folks are reluctant to bite the bullet and call in the bulldozers when grape prices are as high as they are today. But is it wiser to wait, as the older vines decline and yields taper off into negative cash flows?

Our next target would be the Central Coast, specifically such defined areas as Arroyo Seco, the Santa Lucia Highlands, Paso Robles, and the cooler climes of Santa Maria and Santa Ynez. Many of the more southern areas on this coast also experience significant non-agricultural forces affecting land values.

The final area for our investment would be the Delta, the Lodi-Woodbridge area, which is raising consumer awareness and is capable of high yields.

All of these regions, of course, are the focus of intense competition for land and vineyard properties, and our investment objectives will demand a tightly focused effort to identify and acquire the vineyard jewels of opportunity.

Conclusion

We now have some measures of relative performance with which to assess the respective values, risks, and returns seen in vineyard investments in the primary premium grape-producing areas of California. We can also use these tools and techniques to measure investments in other areas, such as Mendocino County or Livermore Valley, or to merely compare a vineyard investment with other investment vehicles. Vineyard investments are a balancing act, juggling risk and return, and of course, timing is everything. ■

Tony Correia, ARA, is president of the independent real estate appraisal firm Correia-Xavier, Inc., which specializes in appraisal of agricultural properties. This article was edited from his presentation to the Vineyard Economics Seminar July 1998, Napa, CA, sponsored by the Wine Industry Symposium.

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1. "Average Long-Term Returns, 1926-1997." *Stocks, Bonds, Bills, and Inflation, 1997 Yearbook.* Ibbotson Associates, Chicago. 1997.

2. "Average Land Values (per Acre), San Joaquin Valley Crops, 1976–1991." California Department of Food & Agriculture.

3. Correia-Xavier, Inc.

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Conference explores Wine Packaging

Packaging and branding strategies will be the focus at the Second Annual Global Wine Package Design Conference, March 25-26, 1999, at the Hotel Nikko in San Francisco, CA.

Packaging and branding strategies continue to grow in importance as more and more brands battle for shelf space, and competition from domestic and foreign producers gives the consumer more choices. This marketing forum is unique and focuses on building brand identities, filling a critical need in the wine community.

Thirteen presentations will share ideas, insights, and information about: how to build strong brand awareness; making your packaging pay-off on the shelf; supporting new product introductions; getting the best value from designers; managing the design process internally; taking advantage of innovations in packaging structure and printing; linking packaging to advertising, promotion and merchandising; building brand identities in the U.S. for imported wines; and the valuable contributions that retailers can make to building sales.

The conference is designed for marketing executives, independent package designers, staff designers, advertising and public relations consultants, distributors and retailers, promotion and merchandising experts, consumer and market researchers, structural packaging and label suppliers, new product planners, and anyone else having a role in the packaging and marketing of wines.

"Where does the wine industry go from here?" will be presented by Vic Motto, partner, Motto, Kryla & Fisher, St. Helena, CA. How many marketers understand how to capitalize on the opportunities that lie ahead or how to create new opportunities? How much growth of the past 25 years is sustainable? How will the industry fare if the U.S. experiences an economic downturn? Motto will discuss these and other issues and review his firm's annual Wine Business Survey.

"The future is now," according to Lee Nordlund, director of marketing, Delicato Family Vineyards, Manteca, CA. How does a 60-year-old winery evaluate the attributes of its brands and determine which should be discarded and which retained and strengthened? The potential rewards are high as the winery focuses on marketing to "non-wine users." Nordlund will share his personal secrets for creating packaging that "whispers to consumers," including the "Ten Commandments of Package Design."

"Reviving brands that carry market history" will be presented by Abigail Anstey and Catherine Healy, partners, Anstey Healy Design (Portland, OR), and Jim Bernau, president, Willamette Valley Vineyards (Turner, OR) and Tualatin Estate (Forest Grove, OR). Where do you want to go? Who do you want to be? The right answers to these critical questions were translated by owner and designer into successful strategies for reviving two established brand names, one that was losing distribution and the other misunderstood by consumers. How this turnaround was accomplished will be explained by the president of the wineries and the design consultancy that played key roles in rejuvenating these two brands.

"For the smaller winery, creativity can make up for limited budgets." Kim Stare Wallace, vice president of Dry Creek Vineyard, Healdsburg, CA, will describe how a mid-size winery operating within tight budget constraints successfully carves out, builds, and extends a unique brand image. Learn how this winery's highly creative approach to packaging and marketing communications, while taking advantage of opportunities for publicity and promotion, continues to succeed.

"The client, designer, supplier partnership — How to put it together for optimum payback." Valuable know-how can be learned from experiences of marketers outside the wine business who face comparable packaging and branding challenges. Finlandia repositioned its world-famous vodka in U.S. markets — a complex undertaking that involved changes in brand strategy, redesign of bottle and graphics, manufacturing a bottle with printing on the glass, and capsule production. Making these changes required integration of capabilities in three countries. Sal Ruriani, vice president, director of packaging development and design, Brown-Forman Beverages Worldwide, Louisville, KY, and Gil Hanson, president, Hanson Associates, Philadelphia, PA, describe this successful voyage and offer important lessons to wine marketers.

"Unique formula for success" — What does it take to manage the marketing of a portfolio of well-known domestic and imported wine brands, develop brand strategies for all these products, and implement the full range of marketing communications from advertising, promotion, and public relations to packaging and merchandising? John Calmeyer, vice president, marketing and public relations and Paulette Nolan, graphic services manager, Allied Domecq Wines USA, Healdsburg, CA will describe what's required — an extraordinary blend of dedication, in-house talent, and innovative thinking supported by an internal design group that responds quickly to the myriad of situations faced every day.

"The life cycle of a wine label, from design to bottle and beyond" — Achieving a successful packaging solution requires teamwork by the client, designer, and label manufacturer. Jeffrey Caldewey, Design and Marketing, Napa, CA, who specializes in wine packaging, and Jay Tapp, president and CEO, Tapp Technologies, Langley, Canada, describe each step of the process and demonstrate how the client's expectations are translated into visual concepts, then turned into a finished label.

"Smoothing the way for an imported wine's trip to the U.S." — How does an imported wine build a credible brand identity in the U.S., where consumers have a wide choice of products? The import must overcome consumer resistance to the unfamiliar, carve out a recognizable identity, and deliver product

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quality and value. Lou Capitao, brand manager, Canandaigua Wines, Canandaigua, NY, and Santiago Larrain, business director, Vina Santa Carolina, Santiago, Chile, will address these and other challenges.

"A global perspective" will be provided by Michaela Rodeno, CEO of St. Supery Winery, Rutherford, CA, who brings knowledge and insights gained during a notable career in every facet of the wine business.

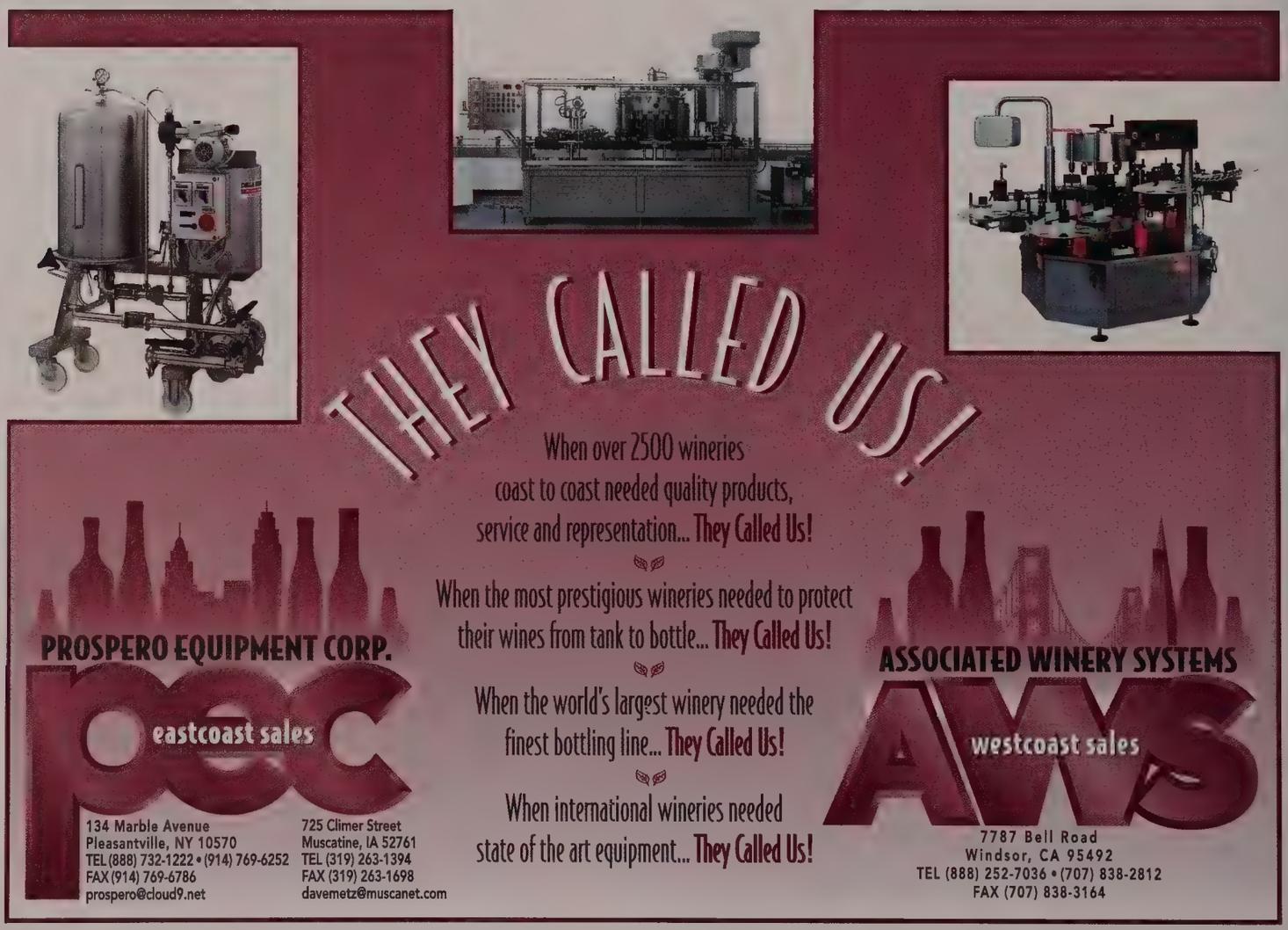
"Are consumers buying the product or the image?" Like other image-related product categories, wines rely heavily on imagery to attract the end-user. Ed Rice, senior executive director, and Nicolas Aparicio, creative director, Landor Associates, San Francisco, CA, explore wine marketing in a global "brand conscious" marketplace and how wine marketers can more successfully apply sound branding principles to evaluate and position their products.

"What's on the bottle counts" — Even the best wine may not find an audience if its packaging does not reflect and explain the product's true characteristics. Barrie Tucker, Tucker Design, Adelaide, Australia, will show how the success of Australian wines can be attributed to quality packaging that supports the quality of the winemakers' skills. He will analyze the Australian design personality that has emerged and will predict future trends in his country's wine packaging, a style he describes as "contemporary, adventurous, and sophisticated."

"The art of brand repositioning" — How do you turn a commodity producer image into a premium brand capable of competing successfully in a crowded marketplace? Decisions encompass such issues as redefining identity objectives; evaluating existing brand names; developing a brand and sub-brand naming system; and redesigning the logotype and packaging. Promotion, merchandising, and public relations programs tie together the pieces of this marketing communications strategy presented by Ian Tostenson, president, and Trish Morelli, marketing manager, Colona Vineyards, Vancouver, Canada.

"Don't shut out the retailer from packaging decisions" — The retailer is closer to the consumer's buying habits than the marketer. Yet, how many wine marketers discuss their packaging with retailers? How many use the retailer as a resource for gauging consumer feedback? How many realize the value of packaging to attract future wine consumers now and build long-lasting brand loyalty? These and other provocative questions hit the industry where it matters — in the pocketbook — and will be discussed by Don Brown, marketing manager, Lucky Stores, San Leandro, CA, and Kent Fitzgerald, senior buyer, Cost Plus World Market, Oakland, CA.

The conference has been developed by Murray J. Lubliner Associates, New York. For more information or to register for the conference, call Murray J. Lubliner Associates at 212/734-7841 or fax: 212/734-4964. ■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Efficacy testing of Eutypa

chemical and biological control candidates with DNA-based diagnostics

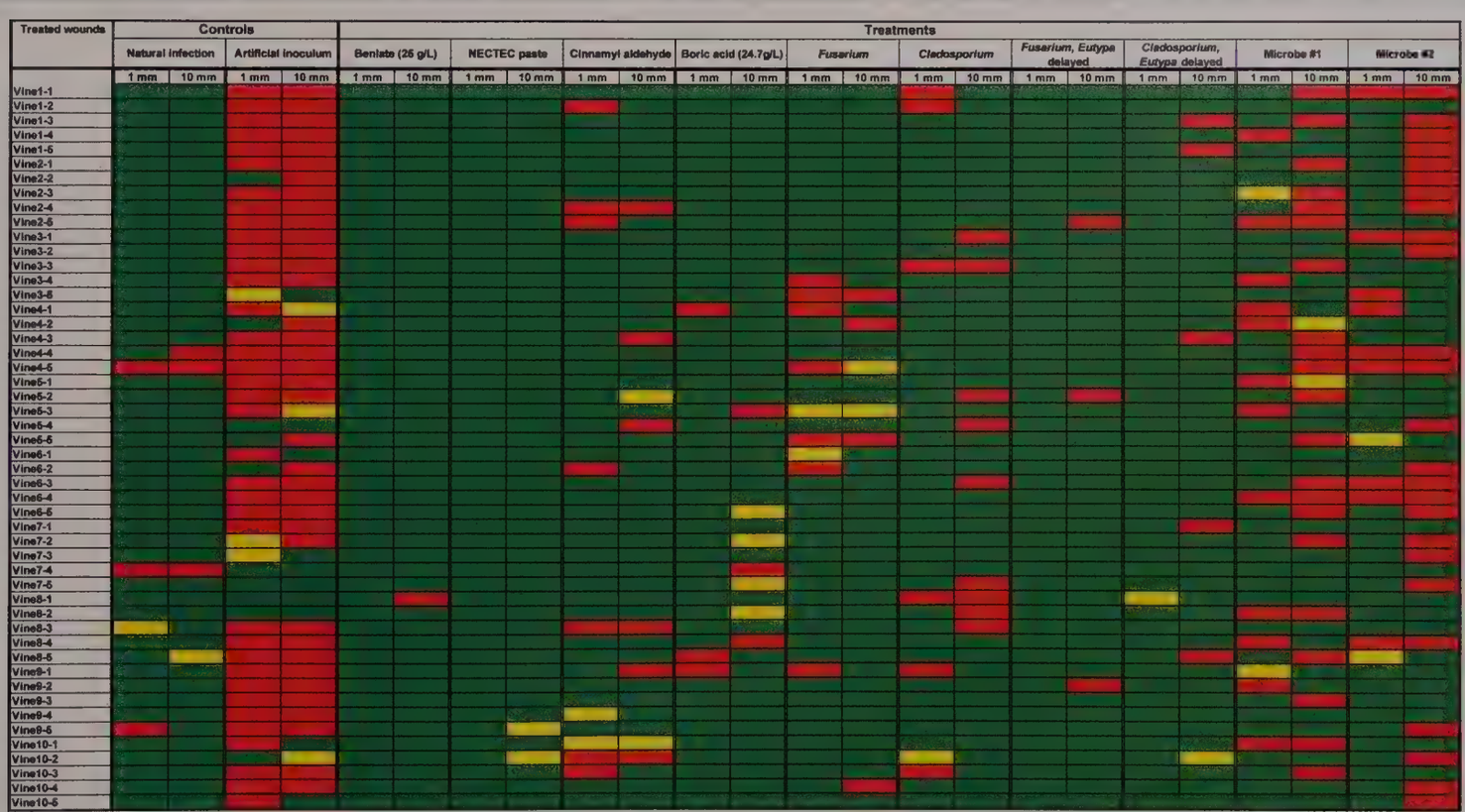
Eutypa dieback presents a serious economic threat to grape production throughout the world. Current disease control measures are largely unsuccessful, consequently, field testing of new chemical and biological control agents is of continuing importance.

This report details the experimental results of a collaborative field trial by researchers from the Biotechnology Department at E&J Gallo Winery (Modesto, CA) and the UC Davis Department of Plant Pathology, to assess the performance of several biological and chemical treatments in controlling Eutypa dieback.

Previous disease control trials have relied upon traditional fungal isolation procedures. However, we were able to definitively measure the success rate of the various treatments by utilizing a new DNA-based Eutypa detection system. Application of this molecular tool has considerably improved the speed and accuracy of treatment assessment.

Eutypa dieback is a canker disease caused by the fungal pathogen *Eutypa lata* which poses a major economic threat to vineyards. The fungus enters the vine via pruning wounds and colonizes the vascular tissue resulting in a chronic, lethal condition.

Canker formation, along with vascular occlusion and production of phytotoxic compounds, results in a reduction in grape yield and eventually in vine

Figure I — PCR test results for individual treatment wounds. Duplicate samples from each treatment wound were analyzed with the Eutypa PCR diagnositc test. The resulting data was compiled and color-coded according to the duplicate PCR test scores: (a) samples were given a green rating when both the PCR test scores were negative, (b) samples with one positive and one negative score were given a yellow rating, and (c) samples with double positive scores were given a red rating.

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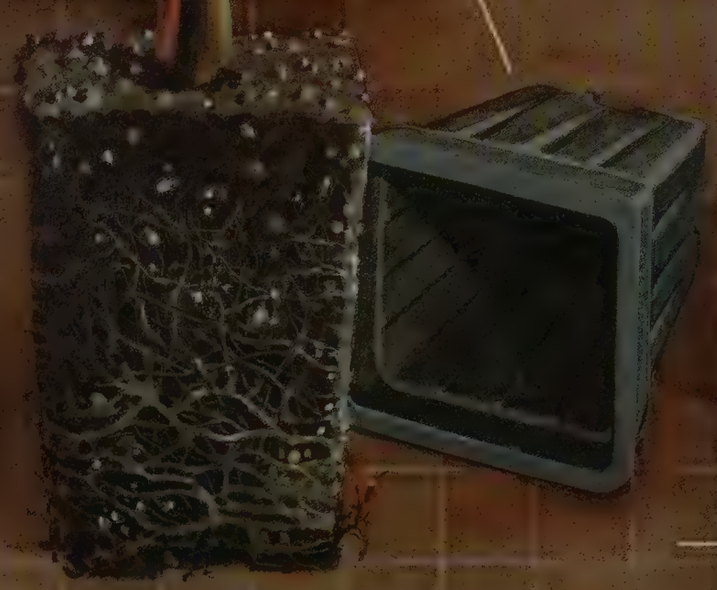

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death.[5, 14, 18] Yield loss due to the disease ranges from 19% to 50% in vines expressing moderate symptoms and from 62% to 94% in vines expressing severe symptoms.[8, 9, 14]

A recent poll (unpublished) of several growers representing the primary California grapegrowing regions (*i.e.* Sonoma, Napa, Central Coast, and Central Valley) revealed that, over the past three years, disease control costs for Eutypa dieback have been the most expensive of all vineyard disease management practices. Based on data provided by respondents, disease maintenance/prevention costs were 72% greater than that of the next closest ranking disease (powdery mildew).

Eutypa remediation costs range from $250 to $500 per acre [Claude Brown (AIM, Inc., Lodi, CA), pers. comm.] depending on severity of disease symptoms. In extreme cases, vines are severely cut back, regrafted or retrained, and trellised within the vine rows. Moreover, disease remediation procedures must be repeated for a minimum of two to three years in order to eradicate or reduce the incidence of the disease within the vineyard.

These disease remediation costs cover only the materials and labor required to rework the vineyard. They do not include the revenue foregone due to crop loss and yield reductions incurred annually as the disease undermines the vineyard over successive years.

Controlling the disease

Control of Eutypa dieback is based on economically practical methods of reducing the number of susceptible wounds exposed during high inoculum periods. Pruning should be delayed until late winter/early spring when the rainfall is low and inoculum levels are minimal.[11] Wound protectants should be utilized and applied immediately after pruning. Immediate application ensures that exposed surfaces are protected against infection by Eutypa spores.

Research has shown that wound susceptibility is greatest immediately after pruning, and then decreases significantly over the next two to four weeks.[13, 17, 18, 19] Wound susceptibility is also a function of the size of the exposed surface and possibly wood age.[12] The larger the wound, the more likely it is to become infected. Consequently, trellising practices and other canopy modifications that reduce the size and number of pruning wounds could significantly reduce Eutypa infections.[10]

Research is currently underway in Sacramento County, CA, to evaluate the influence of different canopy training systems on vineyard management of Eutypa dieback.[1, 10] Training systems under consideration include: 1) cordon-trained with spur pruning; 2) head-trained and cane pruned; 3) Hudson River Umbrella; 4) machine pruning with and without hand follow up; and 5) minimal pruning. Data will be collected over several years and evaluated for long-term trends in viticultural performance and control of Eutypa disease.

Benomyl (Benlate®) is the industry standard for chemical control of Eutypa infection of pruning wounds. It is the only fungicide registered in the U.S. for use on grapevines against Eutypa. Although benomyl has proven an effective control agent when applied at the appropriate time, there has been rising concern and controversy over how long it will remain available in the commercial market. There is also concern that benomyl may not provide sustained protection for the entire duration of wound susceptibility.[16]

As an alternative, various biological control agents have been investigated for their applicability in controlling Eutypa dieback.[3, 4, 6, 17] These have been used in various combinations with chemical treatments, pneumatic spraying secateurs, and other mechanized strategies.

In the past, the most promising research trial results have been produced by treatment with the biological control candidates *Fusarium lateritium* or *Cladosporium herbarum*.[3, 4, 17] Success of these treatments, however, has varied.[2, 7] Additional research and testing are being conducted in order to determine the true merit of these experimental treatments in controlling Eutypa disease in a production vineyard.

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Evaluating field trials

The performance of control trials on Eutypa in the vineyard cannot be assessed visually in the early and intermediate stages of disease development. The outward appearance of symptoms can be delayed for several years until substantial fungal colonization occurs.[10,11,13] Hence, visual assessment is impractical. Evaluations must be made by determining the presence of the fungus.

Eutypa control field trials are typically evaluated by re-isolating the fungus from the treated wounds of trial vines. Treatments are performed during winter pruning of the dormant vines, and the treated spurs are harvested the following year during the next pruning period. Treated spurs are tested to determine if Eutypa was able to overcome the control treatment and colonize the spurs.

Using a standard assay procedure, bark is stripped off the spurs, which are then sliced open length-wise. After surface sterilization, tiny chips are removed from the leading edge of the canker and placed in petri plates containing artificial media.[12] After five days of incubation, the plates are examined for the presence of Eutypa.

The resulting microorganisms are representative of the wound ecology, so frequently other fungi will also grow on the plates. In these cases, traditional definitive identification requires subculturing unknown fungi to purity and subsequent taxonomic identification by a trained mycologist. *Eutypa lata* does not produce sexual structures in artificial media, so it is usually characterized by "white and fluffy" mycelia.

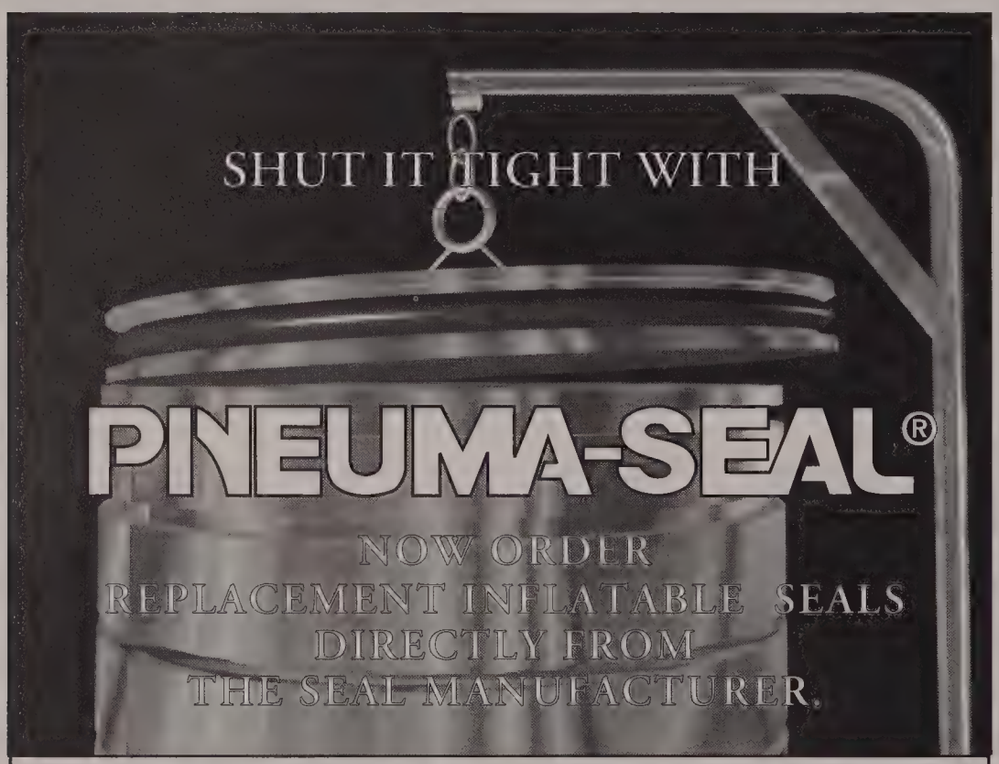
New Eutypa-detection system

The traditional method of identifying the fungus in pruning spurs is tedious and time-consuming, and the identifying descriptors for Eutypa in culture are rather nebulous. Therefore, at E&J Gallo Winery, we developed a DNA-based, species-specific detection system to identify Eutypa definitively (patent pending). Our Eutypa identification system is a molecular detection tool that recognizes a region of DNA that is held in common by all members of that species.[20]

Using this new technology, we can detect the presence of the fungus in plant tissue. Our objective in developing this new tool was to provide researchers and growers with a more efficient way to measure the incidence of disease in a vineyard and to enhance the eradication process.

E&J Gallo Winery/UC Davis field trial

During 1997, a vineyard field trial was conducted at a Gallo vineyard in Sonoma County to test the efficacy of 10 chemical and biological control treatments against Eutypa dieback. Some of these items have been tested in previous studies. In this study, however, we evaluated the success of these treatments by using our new molecular detection tool for diagnosing the occurrence of Eutypa within the treated spurs. This report presents



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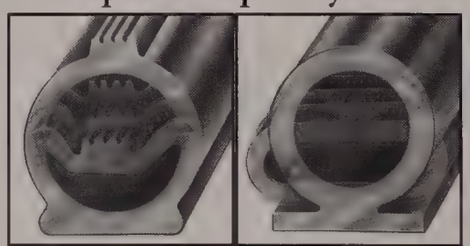

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the trial results and describes the use of the DNA-based Eutypa diagnostics for more accurate trial assessment.

Trial design and initiation

The experiment was conducted on Cabernet Sauvignon vines and began January 6, 1997. A randomized block design with 10 vine replicates per treatment was used. Vines were pruned to two-bud spurs and experimental treatments were immediately applied to the resulting pruning wounds. Five pruning wounds (of one treatment type) were treated per vine, yielding a total of 50 pruning wounds per treatment. The following treatments (and controls) were applied:

C1 = No treatment (control for natural level of Eutypa inoculum).

C2 = Painted with artificial Eutypa inoculum (control for efficacy of artificial Eutypa inoculation procedures).

T1 = Painted with Benlate 50 DP (at 25 g/L) and 2 ml of Triton B-1956 SURFACTANT (2 ml/L).

T2 = Painted with NECTEC R™ paste (1% Propiconazole and 2% Imazilil).

T3 = Painted with cinnamyl aldehyde (1%).

T4 = Painted with boric acid (at 24.7 g/L, with 0.5% B-1956).

T5 = Painted with *Fusarium lateritium* ($8x10^6$ spores/ml).

T6 = Painted with *Cladosporium herbarum* ($8x10^6$ spores/ml).

T7 = Painted with *Fusarium lateritium* ($8x10^6$ spores/ml). Eutypa inoculation was delayed for two weeks.

T8 = Painted with *Cladosporium herbarum* ($8x10^6$ cells/ml). Eutypa inoculation was delayed for two weeks.

T9 = Painted with experimental microbe #1.

T10 = Painted with experimental microbe #2.

To ensure maximum disease pressure, all treated vines, except those in C1, T7, and T8, were artificially inoculated (sprayed) with a Eutypa mycelial slurry the day after treatment. T7 and T8 treatments were inoculated with fresh Eutypa mycelial slurry on January 21, two weeks after treatments were applied.

Pruning wound analysis/Eutypa detection

Trial samples were harvested on February 7, 1998, placed in labeled zip-lock bags, and shipped in coolers to the Gallo biotechnology laboratory (arrived February 9). Each spur (pruning wound) was tested for the interior presence of Eutypa using our DNA-based detection tools.

All vine tissue was rinsed with distilled water. Thin cross sections (less than 1 mm) were excised with a new, single-edge razor at 1 mm and 10 mm from the inoculation site of the spur. Samples taken represented a complete cross-section of the spur when possible.

Samples (approx. 10 mg) were placed in sterile micro-centrifuge tubes containing extraction buffer and ground for 30 seconds with a disposable pestle powered by a hand-held motorized device (Photo 1). Immediately after grinding, an aliquot of the supernatant was diluted with buffer and used as a template with the DNA-based diagnostic primers.

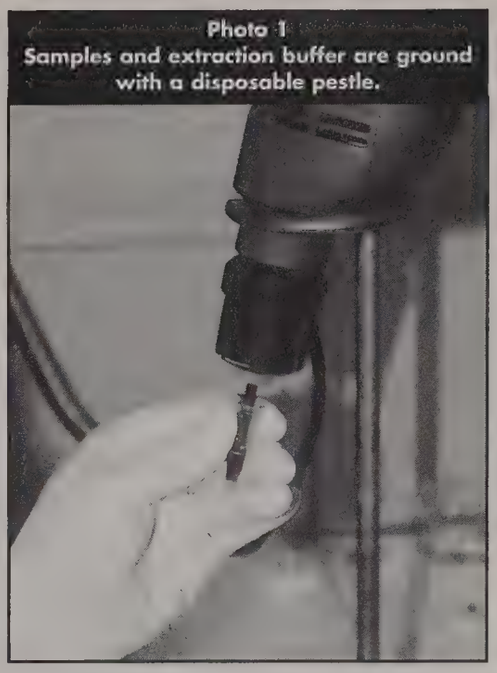

Photo 1
Samples and extraction buffer are ground with a disposable pestle.

PCR (polymerase chain reaction) was performed on the samples, and the products were loaded and separated on an agarose gel matrix. The gels were then stained with a chemical that reacts with DNA and

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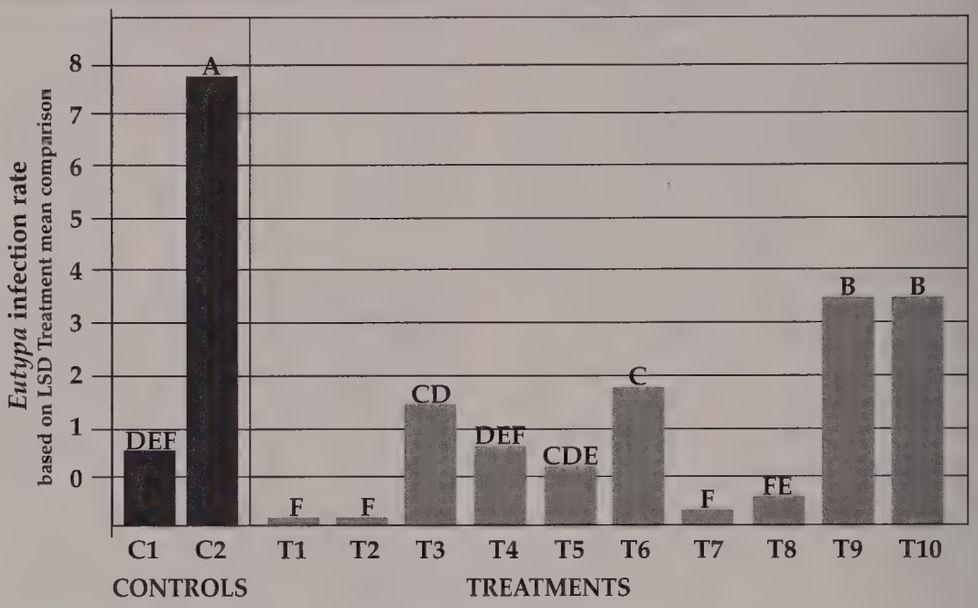
Figure II
A summary of treatments effects on the rate of Eutypa wound infection.



Average infection rates for Eutypa control field trial. Individual treatments are:
(C1) infection rate due to natural Eutypa inoculum
(C2) infection rate due to artificial Eutypa inoculation
(T1) Benlate wound treatment
(T2) treatment with NECTEC paste
(T3) Cinnamyl aldehyde treatment
(T4) Boric acid treatment
(T5) treatment with *Fusarium lateritium*
(T6) *Cladosporium herbarum*
(T7) *F. lateritium* treatment with delayed Eutypa inoculation
(T8) *C. herbarum* treatment with delayed Eutypa inoculation
(T9 and T10) experimental microbe treatments

Note: the treatment bars are labeled with letter rankings (A-F). Treatments that have the same letter(s) in their ranking are not significantly different from each other.

photographed.

The gel results are read vertically. For example, in Photo 2, 12 samples were loaded and separated on the gel. A positive reaction has occurred in lanes 2, 3, 5, 6, 7, 9, 10, 11, and 12, as indicated by the presence of a band. A positive reaction indicates that Eutypa was present in the sample.

Sensitivity comparison (media versus DNA-based detection)

Several spurs were randomly selected and also tested for presence of *Eutypa* using the traditional media isolation procedure.[17] Resulting fungal mycelial growth was visually assessed for presence of *Eutypa* and tested with the PCR-diagnostic primers (for verification purposes).

Results

Duplicate samples from each treatment wound were analyzed with the Eutypa PCR diagnostic test. The data have been presented in two formats. First, Figure 1 summarizes the Eutypa diagnostic PCR test results at two depths within the wound of each treated spur in a color-coded format. Green represents a negative PCR test score for both samples, yellow represents one negative and one positive score for the two samples, and red is a positive score for both samples.

Second, the color-coded PCR test scores were converted into a numerical value to enable analysis of variance: a) green scores were converted to 0, b) yellow to 1, and c) red scores to 2. ANOVA was conducted on the PCR

scores for a vine at a specific depth (1 mm and 10 mm), summed across all five wounds.

Figure II represents the LSD Means comparison of the summed scores. Since there were 10 vines, each of which had measurements at two depths, there were 20 values for each treatment. With 12 treatments in all, 240 values were analyzed. The maximum possible value for one of these numbers would be 10 (if all five wounds were [+] for both PCR reactions), and the minimum possible would be 0 (all five wounds were [-] for both PCR reactions). The treatment bars in Figure II are labeled with letter rankings (A through F). Treatments with the same letter in their ranking are not significantly different from each other.

Six pruning wounds out of 50 (12%), representing four of the 10 vines (40%) in C1 tested positive for natural infection with Eutypa. Whereas 44 out of 50 pruning wounds (88%) were positive for Eutypa when the vines were artificially inoculated with Eutypa mycelia (C2). Every vine in C2 was infected with Eutypa.

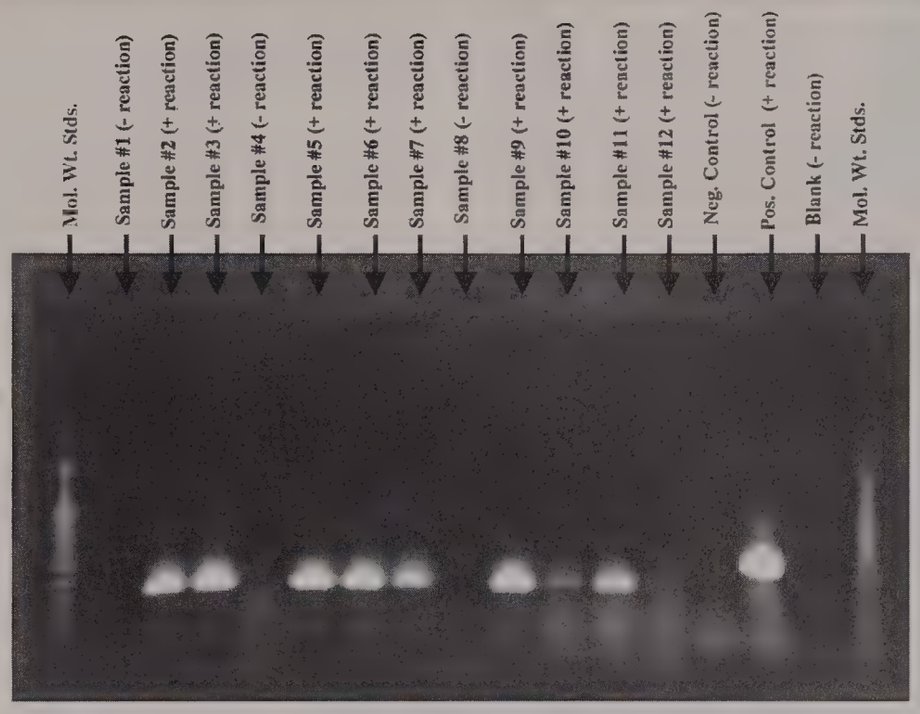
All treatments significantly reduced Eutypa colonization of pruning wounds. The most significant difference occurred between the artificially inoculated (untreated) Eutypa control (C2) and pruning wounds treated with Benlate (T1), NECTEC R paste (T2), and *Fusarium lateritium* when Eutypa inoculation was delayed by two weeks (T7). Pruning wounds treated with *Cladosporium* (also two-week delay in Eutypa inoculation) (T8) and boric acid (T4) also showed significant reductions in Eutypa infection.

When pruning wounds were treated with *Fusarium* and *Cladosporium* and then inoculated with Eutypa the following day (T5 and T6), the ability of these biocontrol agents to protect the wounds was significantly reduced. Cinnamyl aldehyde (T3) was similar to T5 and T6 in its ability to control Eutypa colonization of pruning wounds. Experimental microbes #1 and #2 demonstrated the lowest control rates of all treatments tested.

Discussion

Results from C2 demonstrate that the mycelial slurry is an effective method for artificially inoculating spurs.

Photo 2
PCR Test results of wood samples



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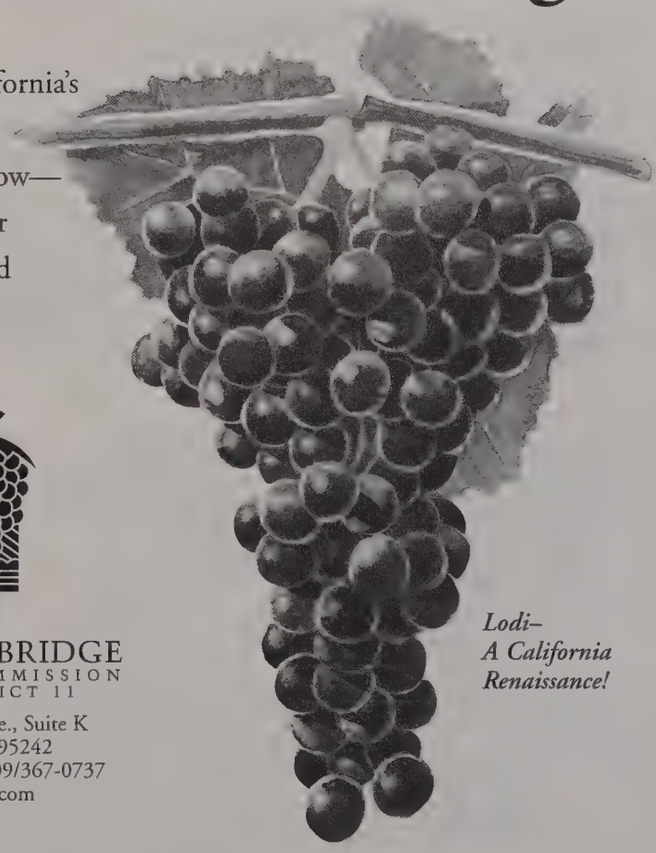

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Indeed, vine infection rate was 100%, and 90% of all the wounds treated with mycelia were infected.

The use of mycelium as inoculum was artificial since ascospores are the normal means by which the fungus infects grapevine wood. The major concern with using mycelium is that many fungicides work by preventing spore germination or by inhibiting growth after germination. However, we have compared mycelial and ascospore inoculation in laboratory tests and have found no sigificant difference in a particular fungicide's ability to protect wounds.

Control of Eutypa dieback is directly dependent upon protecting wounded, susceptible vine tissue from infection. Benlate and NECTEC provide immediate control against Eutypa infection of pruning wounds. Benlate is currently the industry standard; however, NECTEC may have future application depending on whether or not the chemical is finally registered for use on grapes. There are difficulties inherent in using paste applications, and further research is necessary to reduce overall application costs. Research is also underway to test the control capacity of NECTEC paste dilutions. [Gubler, pers. comm.]

Both *Fusarium lateritium* or *Cladosporium herbarum* provided significant wound protection when the biocontrol agents were allowed to colonize the wound surfaces for two weeks prior to *Eutypa* inoculation. Consequently, the utility and efficiency of these treatments will rely heavily on appropriate timing of applications. Treatment application should coincide with an extended period of dry weather when Eutypa spore dispersal levels are at their lowest. It is also feasible that the treatments could be combined with current mechanical pruning equipment outfitted with attachments for simultaneous spray application.

Australian researchers have developed a benomyl-resistant strain of *Fusarium lateritium*.[4] As a result, a strategy was devised to use a two-prong approach for Eutypa control involving both chemical and biological control.[2] Unfortunately, the Australian *Fusarium* strain did not perform well in trials conducted by a research group in another geographic location.[7] This suggests that candidate Eutypa biocontrol agents should be thoroughly screened for uniformity of control across a diverse collection of Eutypa, in order to ensure stable disease control. In this study, we used *Fusarium* and *Cladosporium* strains that were originally isolated from local growing areas. Research is underway to develop isolates with tolerance to benomyl. [Gubler, pers. comm.]

We have also determined that there was a significantly higher level of Eutypa infection at 10 mm compared to that at the 1 mm pruning wound depth. This effect was constant across treatments. One explanation may be that Eutypa has been out-competed by other organisms in the initial infection areas.

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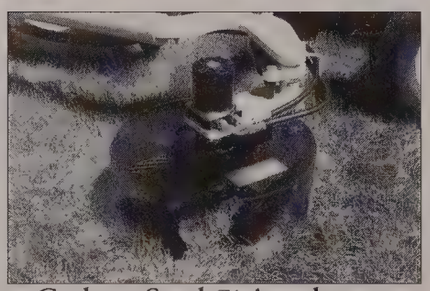

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When performing media isolations, the larger the proportion of older canker tissue that is placed on the agar, the more contamination is observed from other fungi. This phenomenon is common in woody plant infections and has been attributed to subsequent colonization of the Eutypa-infected wood by secondary fungi that out compete Eutypa and therefore are able to prevent or suppress its growth in dead tissue. [Gubler, pers. comm.]

Evaluating effectiveness of DNA-based Eutypa detection

We compared the sensitivity of our new DNA-based Eutypa detection procedure to that of the traditional selective media identification assay. We randomly selected approximately 10% of the analyzed spurs for evaluation with the selective media procedure. We examined nine spurs that originally had a single positive in the duplicate PCR test. None of these yielded Eutypa growth on artificial media.

We also tested 26 pruning wounds that yielded double positives with the PCR test; only six produced Eutypa mycelia. Twenty-seven spurs were selected that tested negative (in duplicate) with the PCR primers. Of these spurs, only four produced mycelia that resembled Eutypa; and of these, only one of the unknown mycelia tested positive with the Eutypa diagnostics.

We reinvestigated this one spur and determined that there may have been some PCR inhibitory substances in the original sample. We used this information to develop an improved protocol for PCR-diagnostic testing of woody tissue. The new protocol requires a reduced sample-to-extraction buffer ratio. This reduction has eliminated variability in results due to PCR inhibitors in the wood tissue.

We have verified that our Eutypa DNA-based diagnostic system is effective (highly specific and sensitive) at detecting the presence of the fungus in samples of woody tissue. Unlike traditional identification procedures that require several days from start to finish, this method directly detects the presence of the fungus in woody tissue, even if there are no visual symptoms.

In less than two weeks, we were able to perform over 2,400 PCR tests: [(12 treatments) (10 vines/treatment) (five pruning wounds/vine) (two wound depths {1mm and 10mm}) (duplicate PCR samples)] on the trial samples. This represents considerable improvement over the traditional method, which requires several weeks for this many tests and provides lower detection resolution.

Now that we have developed a quick, sensitive, reproducible method for detecting the presence of Eutypa in woody tissue, we can use this tool to investigate host-pathogen interactions requiring localization and identification of the fungus. The DNA-based Eutypa detection system can be used for resolving production-related questions as well.

The opportunity now exists to assess the presence and severity of Eutypa disease long before disease symptoms are visually apparent. In the worst-case scenario, growers could use the DNA-based diagnostics to ensure that their sanitation pruning is effective and sufficient. ■

The authors acknowledge Dr. Pam Coleman and Dr. Gary Munkbold for orginally isolating some of the biological control strains; and the Gallo Sonoma viticulture research staff for their contributions to the project.

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American oak in transition: a study of terroir

by Tim Olson

American oak barrels have come a long way, and yet what is really known about American oak? Green, dill, and coconut flavors were trademark descriptors for American oak in the 1980s, but by the mid-1990s, American oak barrels had improved significantly in quality. Richer, spicier, toasty flavors began to marry well with Chardonnay, Cabernet Sauvignon, Zinfandel and other wines.

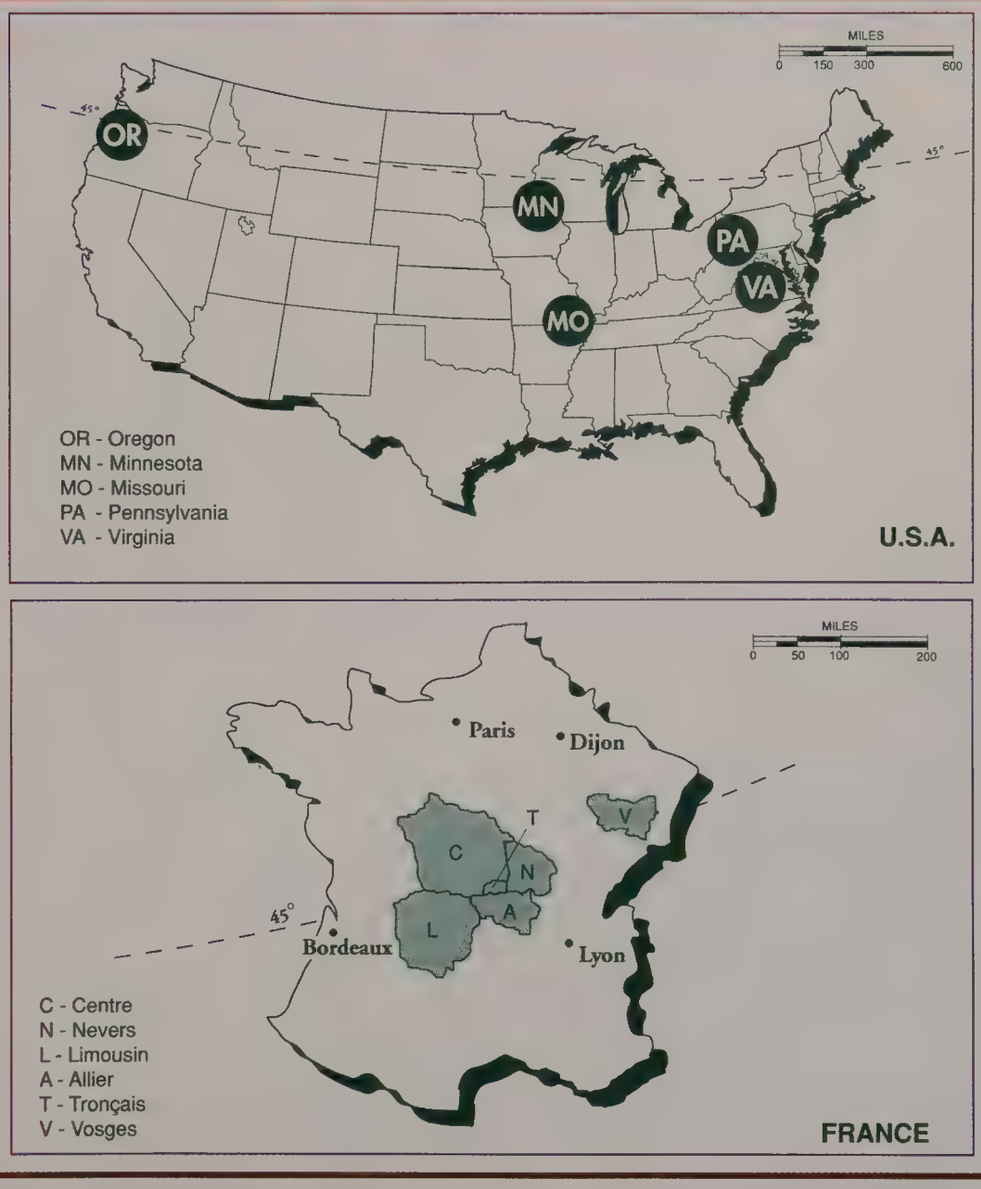
Still, while coopers of American oak historically offered different barrel shapes and sizes and different toast levels, including toasted heads, there have been no choices in sources of wood. Unlike French oak barrels which offer winemakers a choice between various forests, American oak barrels have come in the "house" wood. Each American oak cooper has obtained wood from the eastern hardwood forests of the U.S.,[1] and it has all been assumed to be the same white oak species *Quercus Alba*. Early speculation was that all white American oak was similar in species, regardless of origin.

In an attempt to gain an understanding of forest differences, Tonnellerie Francaise in Calistoga, CA, has begun investigating various American oak sources. Formed in 1980 by Jean-Jacques Nadalie and Duane Wall, Tonnellerie Francaise (T/F) specializes in American oak barrels made with traditional French methods. T/F was the first French-style cooperage in the U.S. For a number of years, the cooperage has sourced wood from various mills throughout the U.S. and conducted experiments. The cooper's preliminary conclusion: the wood source does make a difference!

During the 1970s, the premium California wine industry used a great many French oak barrels. By this time, the concept of oak *terroir* for French forests had taken root. Where the wood came from made a difference, and winemakers were offered a choice of wood origin, a practice that continues with French oak today.

At the same time, a few wineries were using American oak barrels, mostly on an experimental basis. Early wine barrels made from American oak were coopered by whiskey barrel makers in the eastern U.S. These wine barrels were primarily steam-bent like whiskey barrels. Toasting was not a consideration, as the fire used in

Oak forest locations



[1] This is a very general statement. There has been experimentation with other oak species and locations, most notably with Oregon oak (*Quercus Garryana*) which grows from Northern California to Vancouver and is primarily harvested for barrels in Oregon.

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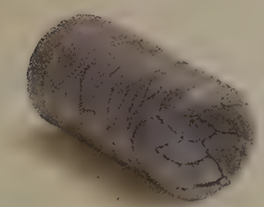

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whiskey barrel production was gas driven, and the objective was to deep-char the inside surface of the barrel. Such treatment was found to be a disservice to wine barrels.

The goal of producing high quality barrels would require serious effort and study, as there were significant differences between American oak and French oak. For one thing, American oak can be sawn, whereas French oak must be split along the grain. Wood density is another major factor; French oak barrels, on average, weigh 100 to 110 pounds whereas the same size and shape American oak barrels weigh 120 to 130 pounds, a 20% difference!

These and other factors affect how the wood cures and seasons and how it is coopered and toasted. By the early 1990s, a good foundation of knowledge about how to work the wood had been established. The next step was to analyze the different sources of American oak.

Terroir of American oak

T/F's recognition of the difference in oak regions or *terroirs* in France led the cooperage to explore *terroirs* within the U.S. T/F currently sources wood from five mill sites: Missouri, Minnesota, Oregon, Pennsylvania, and Virginia. Each mill sources oak within a radius of approximately 100 miles.

The primary species of oak in these eastern hardwood forests is *Quercus Alba*. All species of white oak logs were combined in the field or in the mill, cut and cured, then coopered into barrels. Examination of the eastern forests has shown them to be a mix of species, which varies from region to region, though the color, bark, and character of each species are very similar. The species mix common to each area is:

Missouri: *Q. Alba, Q. Lyrata, Q. Stellata, Q. Macrocarpa* and *Q. Muehlenbergil*

Minnesota: *Q. Alba, Q. Macrocarpa* and *Q. Bicolor*

Pennsylvania: *Q. Alba, Q. Prinus, Q. Bicolor, Q. Macrocarpa* and *Q. Muehlenbergil*

Virginia: *Q. Alba, Q. Macrocarpa, Q. Stellata, Q. Prinus* and *Q. Bicolor*

On the West Coast, the forest diversity found in the eastern hardwood forests does not exist, and the species are more easily identified. *Quercus Garryana*, commonly known as "Oregon oak," is the exclusive white oak in the Willamette Valley in Oregon sourced for barrel staves. It grows from Mendocino County in California to Vancouver in British Columbia, Canada.

Experiment overview

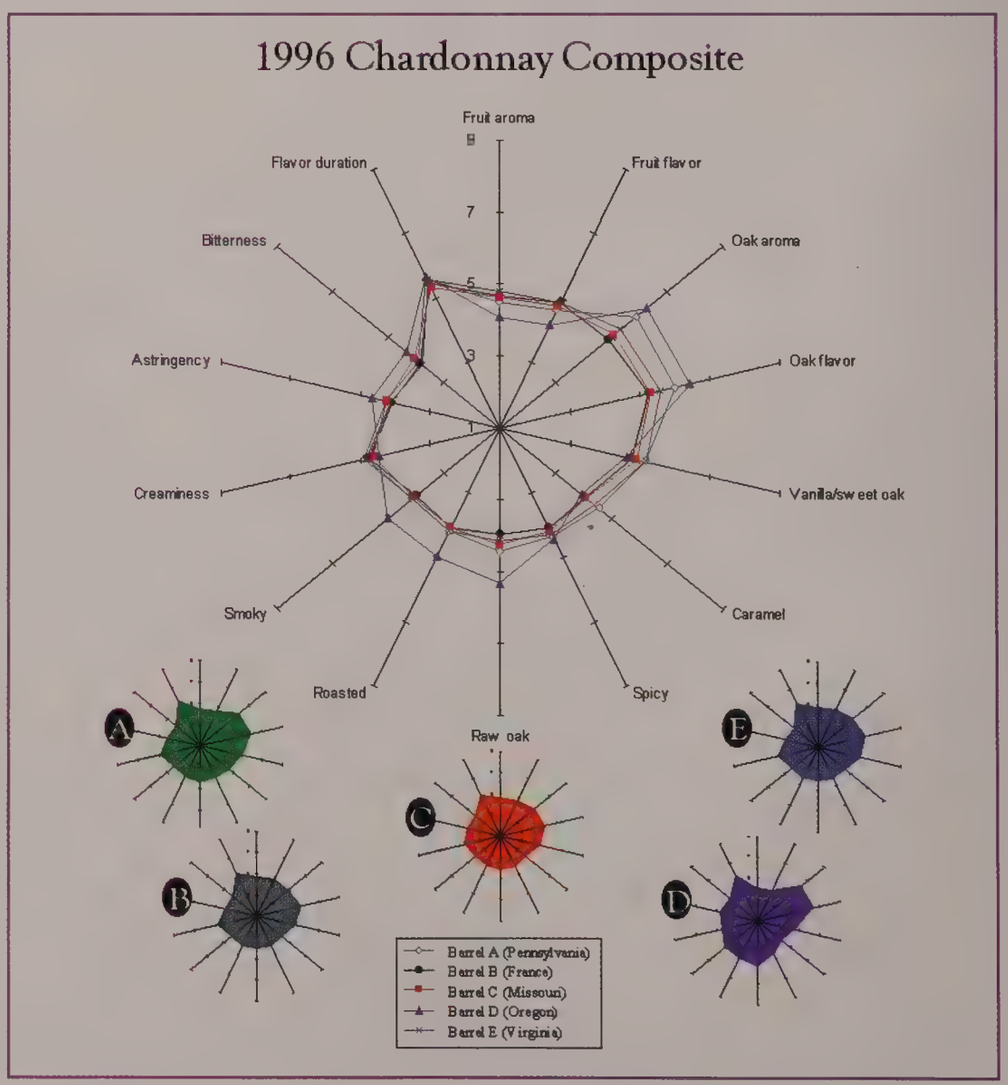
T/F initiated a multi-year barrel experiment, called the American Oak Terroir Trial (AOTT), in 1996 with the help and participation of 10 wineries. The experiment is investigating sensory components of American oak barrels coopered from different geographical regions within the U.S. to determine what, if any, sensory differences can be attributed to *terroir.* They are tracking the oak *terroir* effects across multiple vintages to document consistency in the sensory characteristics offered by each wood type.

The experiment has continued with the 1997 and 1998 vintages. Nine wineries participated in 1997; seven of them were also in the 1996 trial. Of these seven, four are using the same varietals and vineyard blocks that were used in the 1996 trial. With the 1998 vintage, 11 wineries are participating, and again seven have been with the trial since 1996.

The 1996 trial consisted of five lots of barrels with four barrels per lot.[2] Four lots were made with American oak and one lot with French oak for comparison. The wood sources were T/F's mills in Missouri, Pennsylvania, and Virginia, along with oak from Oregon, and one oak lot from the Center of France. (See map for oak locations.)

The American oak staves were aged 18 to 24 months at their respective mill

[2] Two wineries used six barrels per lot (Chardonnay #1, Chardonnay #3), and one winery used 10 barrels per lot (Chardonnay #5). One winery (Merlot #2) used four barrels per lot for the American oak but only two barrels of French oak. All others used four barrels per lot.



sites and shipped to Calistoga for coopering. The French oak staves were aged 30 to 36 months at the mill site in France and shipped to Calistoga for coopering.

All barrels were coopered in Calistoga in T/F's standard Bordeaux Export, 225-liter design. (See Table II for barrel parameters.) They were bent over an oak fire and toasted with the house toast: a slow, deep, medium toast. Heads on all barrels were toasted over an oak fire.

Lots were coded A, B, C, D, and E to conceal wood identities during cellaring and evaluation. The lot codes were the same for all wineries in the experiment. In other words, lot "A" was from Pennsylvania for all wineries. (See Table I for oak identities.)

Every reasonable attempt was made to minimize the differences in how the barrels were made. Wood moisture contents were comparable for each lot. The barrels were made over a five-day period, making "A" barrels one day, "B" barrels the next day, and so forth. One cooper did all the bending, and another cooper did all the toasting. The barrels were made as identically as possible in an attempt to isolate the terroir variable.

The French oak barrels were coopered and toasted exactly like the American oak barrels, rather than being coopered as French oak normally would be.

Five varietals, Chardonnay, Cabernet Sauvignon, Merlot, Pinot Noir, and Zinfandel were used. The experimental wines represent eight distinct grape-growing regions from California and Oregon. (See Table III for listing of varietals and sources.)

Once in a set of barrels, the integrity of the wine in that lot had to be maintained throughout the experiment. If the wines were racked, each lot (A-E) was kept separate and racked back into the same barrels. Chardonnay was in barrel between six and nine months, while reds were kept in barrel between 12 and 18 months.

At the end of the barreling time, wines were racked clean, blended within each lot (equal amounts of the four "A" barrels, etc.), sulfured to a protective level (25 to 30ppm free SO_2), and bottled unfined and unfiltered.

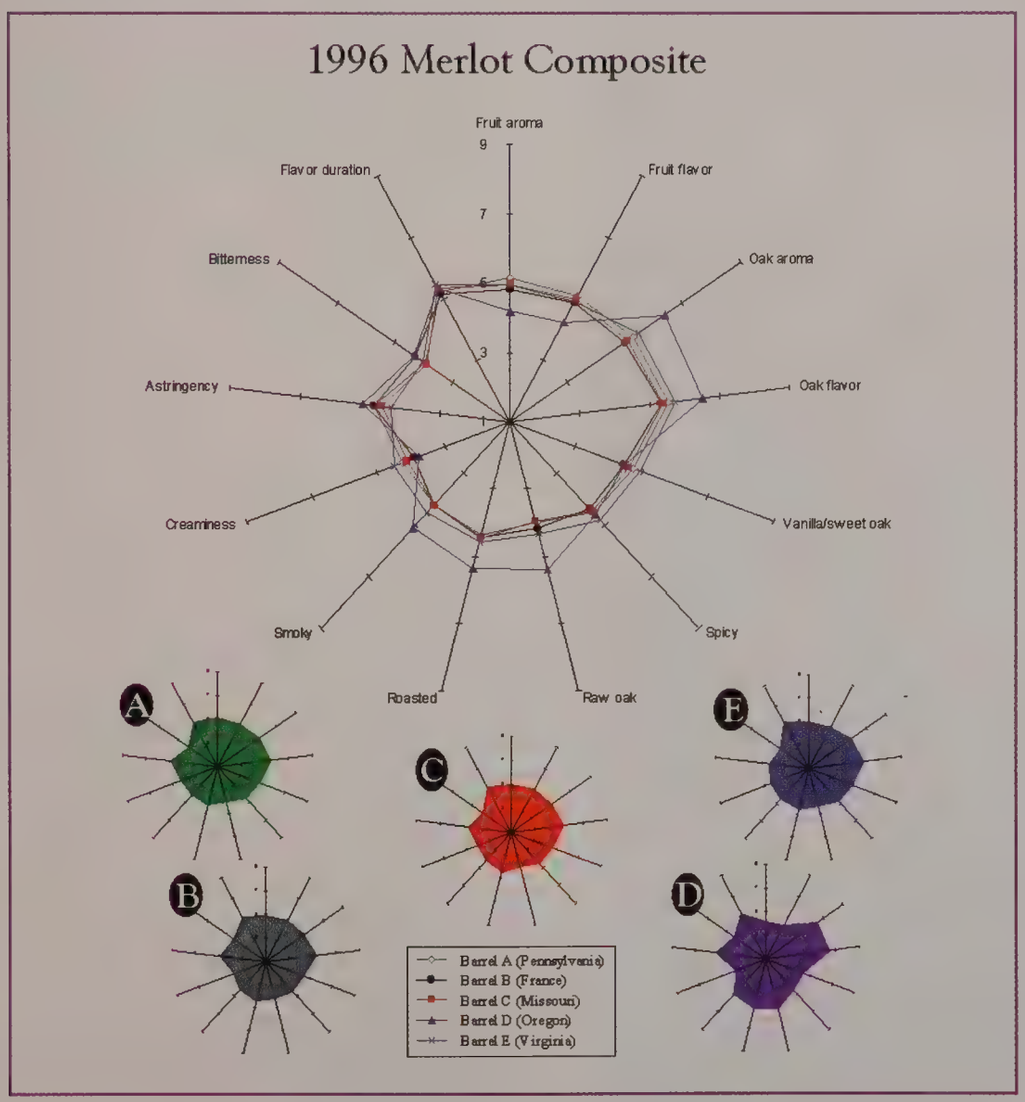


Table I — Barrel Identities

Barrel	Oak Origin
A	Pennsylvania
B	Center of France
C	Missouri
D	Oregon
E	Virginia

Table II — Barrel Specifications

Capacity	225L/60 gallons
Style	Bordeaux Export
Toast level	Medium toast
Toasted heads?	Yes
Wood source (AO)	MO, OR, PA, VA
Stave age (AO)	Air dried 18-24 months
Wood source (FO)	Center of France
Stave age (FO)	Air dried 30-36 months

Table III — Varietals & Appellations

Varietal	Appellation	Area
Chard. #1	Carneros	Napa
Chard. #2	Alexander Valley	Sonoma
Chard. #3	Carneros	Sonoma
Chard. #4	Monterey	Monterey
Chard. #5	Dunnigan Hills	Yolo
Merlot #1	Calistoga	Napa
Merlot #2	Oakville	Napa
Pinot Noir	Yamhill	Yamhill, OR
Zinfandel	Redwood Valley	Mendocino

Tastings and methodology

Only wines from the 1996 vintage have been evaluated so far. Five tastings were held during the winter of 1997/98. Beginning in November and concluding in January, nearly 300 winemakers and other wine industry professionals attended the tastings. At each tasting, five lots each (A-E) of one Chardonnay from two different wineries and a red wine from two different

wineries were poured.

The wines were tasted in two flights: Chardonnays first, followed by reds. Some tastings also included a sample of the final market blend. In total, 20 to 22 wines were poured at each tasting. Wines were tasted blind, identified only by their code.

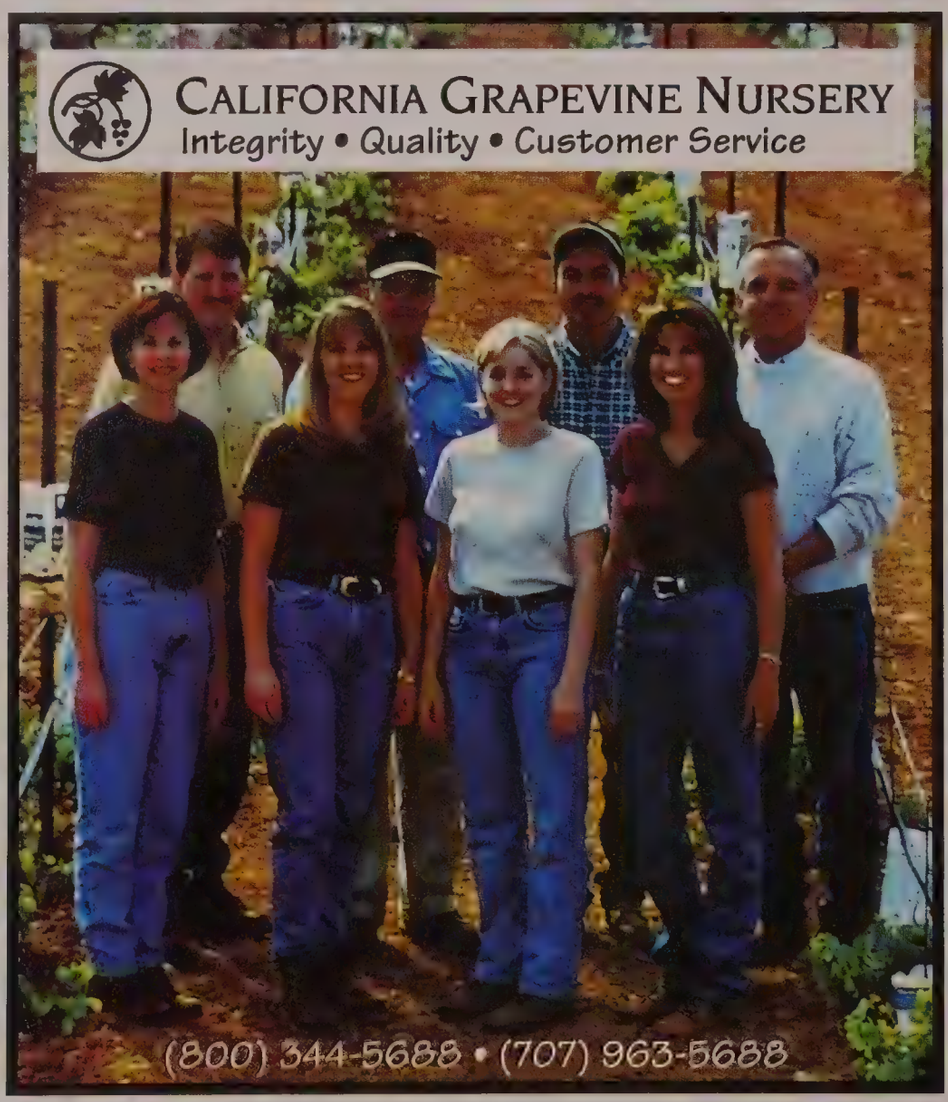
The tastings employed a modified version of the descriptive analysis methodology specifically created for tasting and analyzing oak trials by the barrel committee of the California Enological Research Association (CERA). For this experiment and evaluation, T/F's enologists elected not to vary or randomize the tasting order and reference standards were not used, elements which are customary in the CERA methodology.

Additionally, they did not submit samples to the rigors of a trained panel of tasters. This would have given the statistical data a higher level of confidence from a scientific perspective.

Tasters used a descriptive analysis evaluation form to record their impressions of various oak sensory characters. The tasting evaluation data was entered into a database for analysis. All responses for a particular attribute in a particular wine were averaged, and the results were expressed through a one-way Analysis of Variance (ANOVA) test and polar coordinate scales (spider graphs) to plot and visually compare attribute means.

Findings

It takes years to establish meaningful and conclusive patterns in sensory characteristics in barrel research. These tastings were a look at an experiment in progress; what was tasted was a snapshot in time. These results, while educational and perhaps even enlightening, are just a beginning step toward the eventual goal of understanding the qualities of specific oak terroirs. By no means do the results represent true science, but rather a simple look at the sensory character of various oak *terroirs*.



Statistics

The ANOVA test was used on this AOTT tasting data to insure the differences found in the nose and on the palate between the five oak sources could be supported statistically. The test is useful because it considers many variables simultaneously and produces two important statistics: a significance level and an F-value.

The significance level suggests whether the differences are caused by chance, by the tasting order, or because an attribute difference which is repeatable and measurable has occurred. After determining the significance, the ANOVA test generates a single number (*F*-value) to describe the intensity of difference — the higher the number, the greater the difference.

Two composites were selected for thorough evaluation: one white wine (Chardonnay) and one red wine (Merlot). Combining the Chardonnays and the Merlots into separate composites provided larger sample sizes for analysis, increasing the accuracy of the statistical tests. ANOVA tests for each sensory component were conducted, comparing the data variance of the five oak sources. (See Chardonnay and Merlot composites for details.)

In Chardonnay, the differences among the five oak sources in each of the sensory components are statistically significant. *F*-values are based on numbers/data sets. An *F*-value of 5.0 is considered statistically significant for this data set. Some of the components have *F*-values as high as 70.68, indicating strong differences.

The Merlot composite offered a more subtle, though still varied, picture of the oak sources. Ten of the 13 sensory components were significantly different, but the differences — as reflected in the *F*-value — were consistently less pronounced than those found with the Chardonnay. (See Merlot Composite for details.)

Common sense tells us that white wine is more susceptible to the influence of oak than red wine. Though the present research does not pursue such broad conclusions, we can say with statistical confidence that, while both vary significantly according to wood source, Chardonnay reveals the oak character of a barrel more than Merlot.

Sensory analysis

In terms of sensory differences, the spider graphs reflect visually what the statistical analysis indicates numerically. Sensory evaluation, by its nature, is highly subjective. What one person perceives, another does not. What one person likes, another dislikes. But individual sensory analysis is relative, and when the data are combined into a large group and averaged with enough tasters, a good picture emerges.

In the analysis of the first year of this on-going experiment, Oregon consistently stands out as oaky, smoky, and roasty with a distinct raw wood edge. Among the non-Oregon oaks, oak aroma and oak flavor show the most variation, followed by vanilla, caramel (white wine only), raw oak, and creaminess. In addition, the Merlot also showed good variation with astringency. (See Chardonnay and Merlot composites for details.)

Conclusions

Ultimately, the objective of the T/F experiment is to understand what characteristics these different regional oaks offer and to learn to season and cooper each wood in the way that expresses its best qualities.

While generalities can be drawn about a particular oak source, some variations in the oak characteristic intensities depended on the wine involved. The implication is that the winemaker needs to match the appropriate wood to his or her wine.

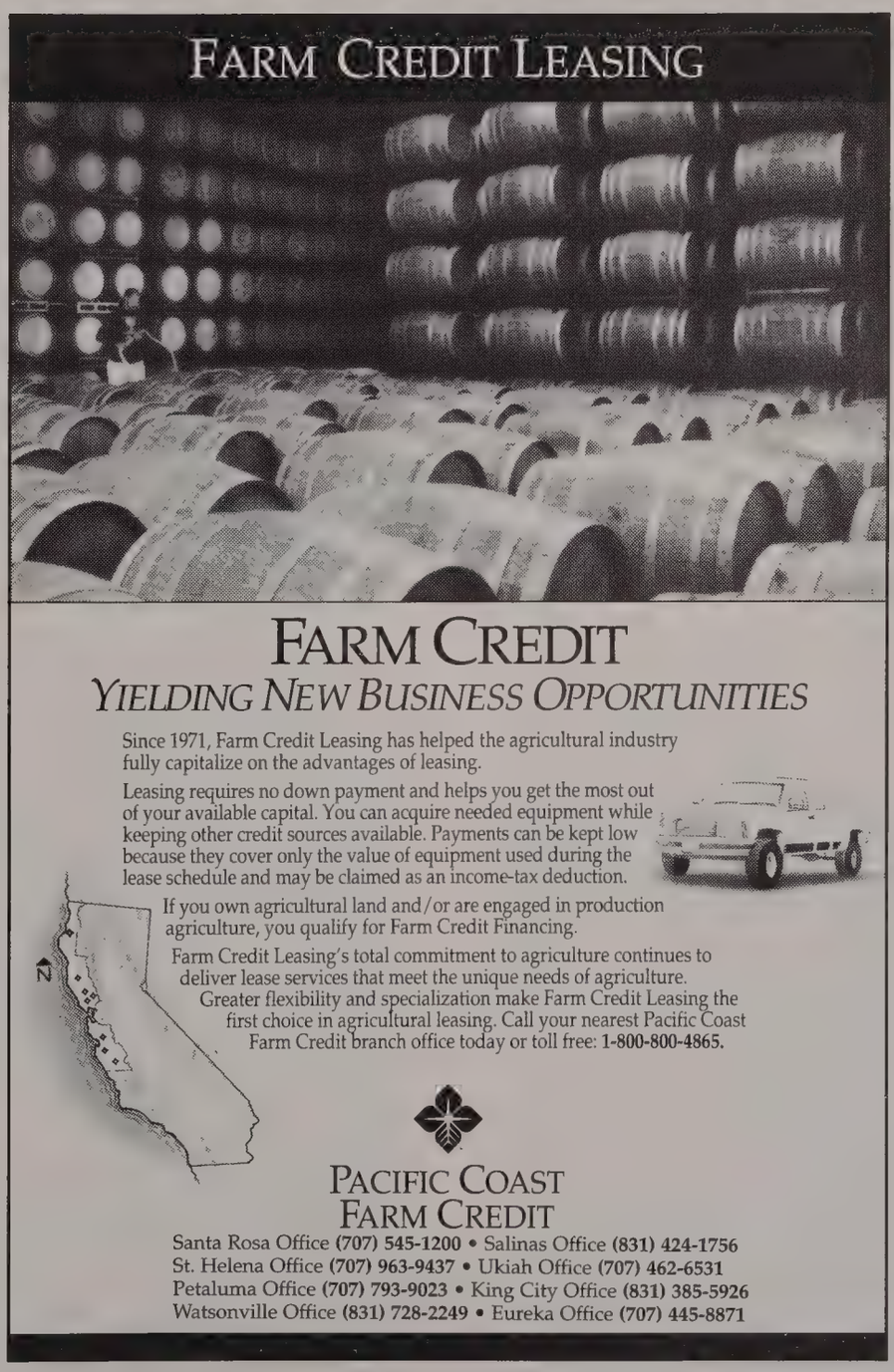
Oregon oak is a very intense wood that offers lots of oak aroma and flavor. However, it is so overt that it skewed the results of the ANOVAs for all other oak sources. If one oak source can so dominate sensory impressions that it overshadows all the remaining participants, its usefulness to the experiment as a whole is limited.

While it is premature to draw firm conclusions about the *terroir* differences these various oaks offer, the experiment already indicates patterns suggesting that differences unique to oak *terroirs* do influence wines.

Of course, this begs other questions about the oak *terroirs*. How much of these differences are due to the wood or mix of wood species? What differences are due to where and how and when the wood is seasoned? Do annual climatic variations play a role? Are the sensory characters found in this trial consistent from vintage to vintage? How can the variables be manipulated in order to produce the best barrels possible?

More time and more research are necessary before any firm conclusions can be drawn. The trials in 1997 and 1998 should help answer questions about the consistency of sensory characters across vintages. This winter, Tonnellerie Francaise will hold another series of tastings to evaluate the 1997 AOTT experimental wines. ■

Tim Olson is the managing partner and winemaker for Domaine Archer and is also a winemaking consultant. He can reached at: 707/566-8007.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Ferrari-Carano fire brigade trained and ready

by Millie Howie

Take one winemaker, who knows from first-hand experience how important fire protection in a rural area can be, add a winery owner who understands implementing safety measures, and a pumper engine looking for a home, and you have the makings of a cracker-jack fire brigade. That's just how the fire brigade at Ferrari-Carano Vineyards & Winery (Geyserville, CA) began in 1995.

"Because I lived and worked in rural areas with high fire danger," says George Bursick, Ferrari-Carano winemaker, "I knew there was a real need for trained personnel to shorten the response time in medical and fire emergencies. That was the reason I joined the Geyserville Volunteer Fire Department. In addition, Don and Rhonda Carano, winery owners, had expressed some concern about adequate protection for the facility, particularly after construction of Villa Fiore (our Italianate hospitality center) was underway. As dependable as the local departments were, Don felt there should be some way we could put something in place to do it ourselves."

In a happy coincidence, the Petaluma Fire Department had a Type 1 Van Pelt pumper engine for sale. Bursick inspected the engine, felt the price was right, and proposed to the Caranos that they buy it. Their response was, "Go for it." Once the engine was on site and hooked up, enthusiasm snowballed.

"We were already in compliance with the Occupational Safety and Health Administration (OSHA) mandates for industrial emergency response provisions," says Hoss Milone, chief of the Ferrari-Carano Fire Brigade. "With the engine on hand, we planned a 10-person fire brigade, and a recruitment letter was circulated among the employees." Applications came pouring in. Selections were made based on the applicant's previous experience dealing with the public, knowledge of first aid and the facility layout, and location of the applicant's work space within the winery structures.

Amanda Augello, assistant tasting room manager, was an almost automatic choice, because of her interface with the public, and the fact that a fire extinguisher, oxygen unit, and first aid supplies were stored in her area.

Other members of the brigade, in addition to Brigade Chief Hoss Milone, barrel supervisor, include Pat Reece, head of maintenance; Kristina van Loben Sels, enologist; Maria Canhola, cellar worker; Mark Wiget, cellar master/safety coordinator; Brad Bellow and Ricky Phillips, maintenance engineers; George Bursick, winemaker; and James Knies, cellarman.

The brigade responds to medical or fire emergencies and hazardous materials spills. Its primary duty is to make sure all employees and visitors have been evacuated to safety. Victims are given first aid and made comfortable until professional help arrives. "Our first duty," states Milone, "is prevention, next is search and rescue."

The first step in training brigade members was to provide them with

Members of the fire brigade prepare for a training session at Ferrari-Carano.

emergency medical skills. Next, they were instructed in fire science and behavior by the Sonoma County Department of Emergency Services. J. W. Sealy, a retired fire chief, now a county fire inspector, was the training officer. For 18 months, the team trained for four hours every week, except during harvest.

Each member completed 50 hours of classroom work before field training. Outside work included putting out real fires during annual sessions at the Santa Rosa burn tower. Actual experience with flames and smoke prepared them for the realities of heat and fire patterns when they are faced with the real thing.

"All of this is quite expensive," Milone explains. "From their years in the hotel business Don and Rhonda Carano understand the importance of having a trained staff ready for any emergency situation, so even though classes take a lot of time and training sessions cost a lot of money, they have been strongly supportive," affirms Milone.

The fire district served by the engine is confined to the 60 acres of estate property surrounding and encompassing the winery, Villa Fiore, and all outbuildings. With additional training by the Geyserville and Cloverdale fire departments, the brigade could be upgraded to offer mutual aid response off the wine estate on a limited basis. Geyserville has plans to construct a firehouse in the Dry Creek Valley, to house an engine and small fire crew. Members of the brigade will be available to assist the Geyserville staff and can, individually, join that department as volunteers.

Team members all have CPR certification and Title 22 first aid training. Mark Wiget, cellar master, is safety coordinator for the winery, and James Knies, cellarman, is medical officer and CPR instructor, and is a trained Emergency Medical Technician (EMT). All fire brigade members are certified to operate the automatic external defibrillator.

In the 2½ years since its formation, the brigade has provided aid to a visitor with a pacemaker problem, various slip and fall accidents, bee sting allergic reactions, and in a "Good Samaritan" response, has assisted with auto accidents on nearby public roads. Fortunately, it has never had to turn out for a fire.

Each of the seven men and three women on the team has had disaster training, and, by law, the training must be repeated each year. Monthly fire drills are conducted, and during the drill, nine fire fighters suit up in full gear. The winery has an internal 911 center, and dispatch of the brigade is handled through the main winery office. Each team member is equipped with a hand-held radio for constant communications during a drill or real emergency.

Routine fire inspections are conducted by the brigade to assure that fire extinguishers are up to code, and

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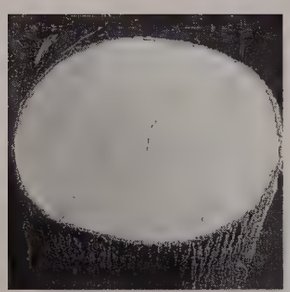
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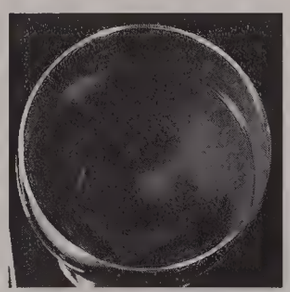
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safety measures are being observed in storage of combustible materials. "Even in our situation, with winery buildings of stone and concrete and thousands of gallons of non-flammable wine, there is always something that can burn," says Milone.

The Sonoma County Emergency Services Department trains the brigade in dealing with hazardous materials (hazmat), so they can identify various powders and liquids and can cordon off and contain the spill until the county hazmat team arrives. Most important is protecting Dry Creek and Dutcher Creek from pollution, since the winery property is adjacent to a California State Fish Hatchery. "We have protective, portable dikes, and absorbent pillows to control the flow and shut off drains if necessary," Milone explains.

In addition to first aid kits, which are strategically placed throughout the winery, special storage lockers contain medical equipment such as O_2 resuscitators, an automatic defibrillator, C-Spine protectors, and back boards. The engine, which is maintained at peak readiness, is equipped with hoses and nozzles to fit any standard hydrant, and all the hydrants on the winery property provide water pressure equal to that in urban cities. Four self-contained breathing apparatus units are aboard the pumper for the brigade's use.

The Caranos erected four 30,000-gallon water tanks, fed by a separate well, capable of delivering 1,500 gallons of water per minute for fire-fighting. Waste water ponds can be used as back-up in an emergency.

All new personnel at the winery must participate in a two-hour walk-through of the complete facility, so they will be familiar with the alarm system, materials storage, and emergency triage center.

In their free time, the 10-member department supports the activities of the Alisa Ann Burn Foundation by participating in the annual fund-raising parade of engines and by donating 20% of the proceeds from the sale of specially-designed fire brigade tee shirts, and donates bottles of a red wine blend of 80% Merlot and 20% Malbec called "Fire Engine Red," for employees only. ■

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Insights from BARRY WISS

Sutter Home Winery

by Craig Root

Barry Wiss manages Sutter Home Winery's tasting room. Sherry Page manages a "Blend Your Own Wine" program for visitors.

Before Barry Wiss, manager of Sutter Home Winery's tasting room and inn (St. Helena, CA), joined the wine industry, he had considerable experience in the hotel industry. That experience translated well to the challenging hospitality aspect of the wine business. I consider him to be one of the sharpest people in the business. While he manages a large operation at Sutter Home Winery, many of his insights can help smaller tasting room operators as well.

Craig Root: *How did you get into the visitor center business?*

Barry Wiss: I've been in hospitality my entire career. I started out at 14 as a dishwasher in a health food operation in New Orleans and eventually became manager. It was a great little operation, and many of the values I learned there I still use today.

Next, I worked in the hotel business as chief executive steward at the Canal Street Sheraton Hotel in New Orleans for six years. It was a huge operation: 50 stories high with 1,200 rooms, now expanded to 2,000 rooms. We had banquets, back-to-back, for 2,000 people, two Republican conventions, Super Bowls, and other large scale events.

From there, I transferred to a new facility in Redondo Beach, CA. My wife was also in the hospitality business so, of course, we had to visit the wine country. Our first visit was in 1989, and we looked at each other and knew we had to live here. We moved in 1991 and have loved it ever since.

CR: *What was your first winery job?*

BW: I started with Schramsberg Vineyards (Calistoga, CA) as hospitality manager and came to Sutter Home in 1995. It seems like only six months ago. The time has just flown by.

CR: *You manage an inn at Sutter Home Winery as well as the tasting room. What advice would you give people who have a B&B attached to their tasting room?*

BW: We primarily use our inn for the trade: distributors, wine writers, and buyers. We're running about 75% occupancy throughout the year, and 90% of that is trade-related. We believe the more time we have with people who help us promote our wine, the better.

Overall, the trick is to keep it simple and serve a great breakfast. We used to serve a continental breakfast, and we have gone to a full breakfast including freshly baked items, which are a big hit. Little things like music choice or fresh flowers are important. A knowledgeable staff that knows the area and can assist guests during their stay makes a big difference, too. Because most of our guests are from different time zones, we offer an early morning coffee service in our garden.

CR: *Let's talk about your wine-tasting operation, especially non-wine item sales. Haven't you increased sales by 27% overall with a better non-wine selection?*

BW: Yes, the wine country has become more competitive, and while our main focus is the wine, people are looking for something different while they're in the area, and they want to take home something besides wine.

What's really been the superstar for us in this area is specialty gourmet food items. I can't say enough about how successful this has been. One of the most important facets of this is our private labels, which people can't get when they return home. We're going to more and more private labels. If an item is doing well, we switch to private label. That way we make the sale, and every time a customer uses that garlic oil or dipping sauce at home, our name is in front of them and their guests.

Another great mover for us has been the D. L. Jardines peach salsa. In our last fiscal year, we sold more than 8,000 jars. Food items in general are about 27% of our total sales. The other item doing equally well is parmesan/garlic olive oil dipping sauce. You put those three ingredients together, and people really respond to the flavor.

A good tip is to work with vendors on

sampling the food items whenever you can, because sampling is the key to sales. If you're doing a good job for a vendor, he or she may contribute to your sampling process. If the product is good, we can make it work.

CR: *One of the best cross-merchandising examples I've seen is your promotion of sangria with your own sangria salsa recipe book and Sutter Home's* Soleo *wine. Could you tell us about that?*

BW: Sutter Home prides itself on producing everyday drinking wines. *Soleo* has been available for several years, and it's a light red wine made to be served chilled. We had some reservations about the sangria program because there's this myth that everyone who comes to Napa Valley is a wine expert, but many visitors are novices. During the summer months, we have a sangria bar where we make sangria in front of guests and serve it to them. Next to the bar, we have a big display of the book on sangria and salsa recipes.

CR: *You created that book yourself with Hoffman Press, didn't you?*

BW: Yes, I was a co-writer of that book. I did the sangria recipes.

CR: *What's great about that concept is that the sangria took off — which increased book sales — which then increased sales of Soleo. Plus, by creating your own book, you have a higher profit margin when you sell it.*

BW: That's right; it was a lot of fun throughout the whole process. Do something special and people really respond. Our mail order business for these items has doubled in the last year, because customers can't find these special products elsewhere. We're diligent about selecting items that appeal to the public.

CR: *How about display?*

BW: We have a very large (6,000 sqft.) tasting room, so the trick is to keep people from feeling lost. One tip is that we taste our food on barrels. We created signage with wood trim that attaches to the barrel and stands up above the barrel. You can buy a color printer and programs with clip art really cheaply these days. Use them to create seasonal displays, such as Christmas and Valentine's Day — anything to attract customer's eyes and draw them to a product.

Another example: we sell a lot of refrigerator magnets. I'm always amazed when I see how many we sell. We bought an antique 1925 refrigerator to display the magnets, and that has attracted a lot of attention and has become a conversation piece. In addition, it goes with the old-time theme of our tasting room. If you've got an item that's doing well, take the display a step further.

CR: *You have another philosophy which is: "keep people looking up" — which I mentioned previously in* **PWV.**

BW: Yes, you have to pay attention to your customers. Observe them. We used to have all our information on the bar — tons of loose leaf papers. Everyone went to the bar and just looked down. We changed and went to beautiful redwood chalkboards mounted high on the wall behind the tasting bar. All the information is up there, so the customers are also looking around the room. We hope they'll see something to buy in the tasting room while they're scanning the

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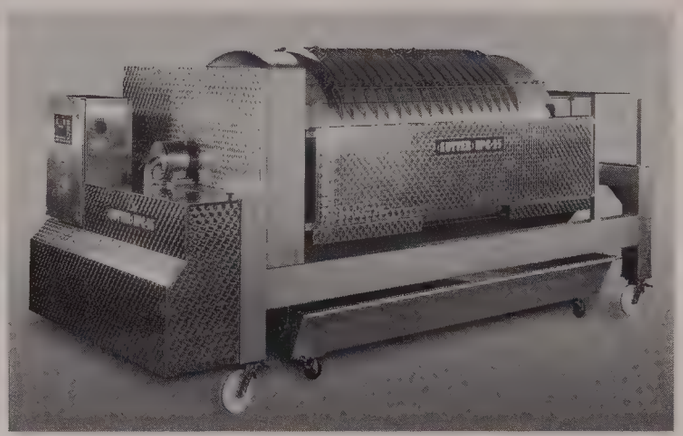

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blackboard. It's a little thing, but I believe it helps.

CR: You have built the Sutter Home Winery reputation on White Zinfandel. How do you get people to gravitate to other wines?

BW: That's funny you should ask because the myth is most people start out with White Zinfandel and then progress to other varietals. That's what I did. But we commissioned a study recently which showed that many people who start with White Zinfandel stay with it — which is why it's so popular. We've expanded that concept by adding our *Portico* line, which is White Zinfandel with less than 1% natural fruit juice added. So now, our White Zinfandel visitors have more options. We have lots of other great varietals, but we let people discover them rather than push them in that direction.

One thing we have added is our "Blend Your Own Wine" program. It was a lot of work to get permits from BATF and Napa County, but it was worth it. We have a special room which can accommodate up to 12 visitors who learn about blending by actually doing it with lab beakers.

They try a dry red using a 75%/25% blend, a 50%/50% blend, and a reverse 25%/75% blend of Cabernet Sauvignon and Merlot and then one dry red in which they can create whatever blend they want. They can also blend a white wine using Chenin Blanc (3.85% residual sugar) and Moscato (8.8% residual sugar).

They choose one blend they like best, and we then bottle it for them with a choice of four labels they can customize. Sherry Page, who manages the program, says the majority of visitors are taking a blended white wine home. All this costs only $10 for the blending experience and one bottle to take home, and it's been a big hit. They can purchase two bottles for $9 each or three or more bottles for $8 each. Another aspect of the program that's really worked for us is that we put the customer's name and blend into a database, so they can call up six months later and have a case of their exact blend with their label shipped to them.

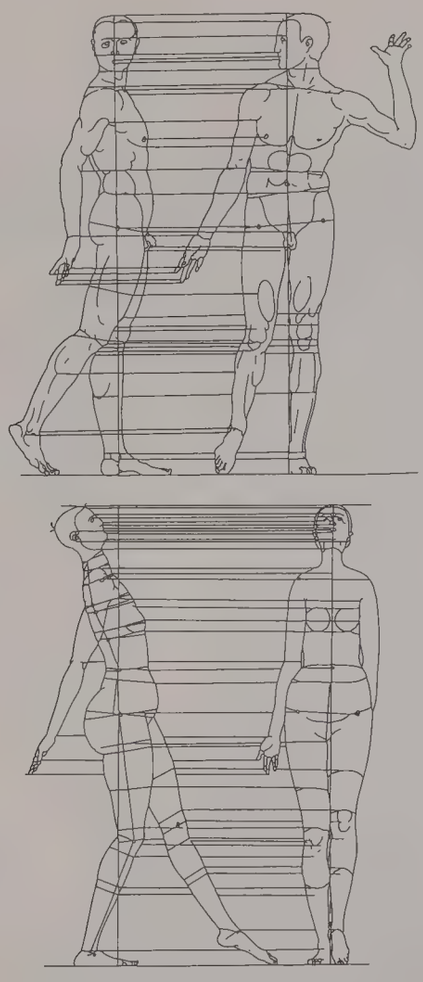
CR: That's a great idea! We both know the three secrets of service are staff, staff, and staff. How do you find and train good people?

BW: Remember: when all is said and done, the most important element is great service. We really focus on that. People really respond to it. We network and advertise to find our staff, but the main thing is we look for people who like people and like communicating with them. Then we train our staff very thoroughly. Besides verbal training on our wines and products and procedures, we have a lot of written material. After their training we have a written test eight pages long. They keep taking it until they answer all questions correctly. We've been very fortunate to hire and keep a great staff.

CR: Before we close, do you have any other thoughts on merchandising?

BW: There's one thing I encourage managers to do, particularly in a big operation like this: Be continually analyzing customers and merchandise.

Drawings from Albrecht Dürer's *Proportionslehre*, ca. 1528



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Where people are congregating or not congregating in your tasting room, for example, is important information.

I also brought a system with me from the hotel business which allows me to thoroughly analyze how each item is doing. It's called a product analysis review and it breaks a product down to all its components, so each part can be evaluated for price margins, units sold, revenue, costs, and popularity ranking.

The winery program breaks each item down to one unit and compares it to every other non-wine item. At this level, I compare price and mark-up or profit. In the second phase, it compares the item to everything else in its category, such as apparel or food. I then compare it in terms of the percentage of sales compared to other items. For example, if I see that it has a much higher percentage of sales than every other item — it's really moving — I know I may be able to increase the price a bit because it's selling so well.

I then group products into three categories:

1. ***Dogs*** — These are items that are not moving. Maybe I need to eliminate the item or get a better price from the vendor.

2. ***Puzzlers*** — These are items that sell well, but on a sporadic basis. Maybe I need to move the item or use different signage.

3. ***Stars*** — These iems are consistently selling well.

I analyze this report weekly and then make decisions accordingly. It's a very effective system. It's also very useful leverage when dealing with vendors. "Mr. Vendor, I like your product, and I like working with you, but the product is not moving. Here, I'll show you my product analysis review." I had one situation where I was able to negotiate a lower cost per unit as a result.

CR: *I always like to end an interview on an upbeat note. What's a humorous experience you've had in the wine business?*

BW: When I was with Schramsberg, we had a very upscale couple visit in a brand new spotless BMW convertible with the top down. They toured and tasted for a while and then left. They came back a while later wearing a very strange look on their faces, and asked "Do you have a dog?" Yes, we did, a large Lab named Jesse.

When we went out to their car, Jesse was in the back seat. Not only had he eaten most of their upscale lunch (pate, caviar, etc.), he'd also chewed up their very upscale picnic basket. Needless to say, we had to comp a lot of champagne to smooth that situation over! And for a couple of days after that incident, Jesse was very finicky about his regular chow; he'd developed champagne taste on an Alpo budget. ■

Please look for future articles in this series. If you have comments or suggestions, call Craig Root at 707/963-7589.

Craig Root is a 26-year veteran of the wine and hospitality business, including 15 years at Beaulieu Vineyard. He has worked in all capacities at hospitality centers, primarily as manager. For the past four years, he has served as a consultant for visitor centers through his own company, Craig Root & Associates.

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ACHIEVING INTENSITY IN SAUVIGNON BLANC

by Eleanor & Ray Heald

How do vintners develop flavor intensity in Sauvignon Blanc? Answering this question are winemakers from Lake, Napa, and Sonoma counties in California and Washington state. They focus on the influences of site, soil, vineyard techniques, and harvest parameters as well as fruit handling from harvest to cellaring.

In previous reviews of Sauvignon Blanc, *PWV* focused on grassy styles, the hallmark of Pouilly Fumé and Sancerre from France's Loire Valley, and herbaceous styles, similar to and including those from the Graves region of Bordeaux.

We have considered both European and California Sauvignon Blancs and assessed that cooler growing regions tend to produce green, grassy, and more herbaceous Sauvignon Blanc styles, while warmer climates highlight riper, tropical fruits, and citrus (grapefruit, lemon, and lime) aromas and flavor.

Within these abstractions, some wines have come across thin, and yes, even whimpy. They are clean, quaffable white wines, but hardly expressive of an intense style. Some have oak regimes which contribute vanilla hints or roasted nut characters, but they aren't really intense.

In general, winemakers interviewed by *PWV* are focusing on fruit flavors to get the intensity of Sauvignon Blanc they seek.

Defining intensity

"In the minds of most people, descriptors associated with intensity are herbaceous, grassy, and cat piss," says Bob Pepi (Andretti Winery). "But personally, for our Napa Valley fruit, I tend toward intensifying floral and tropical fruit characters, such as pineapple and melon. Perhaps to some, these are not commonly among intense descriptors, but I think they are more pleasing."

Bruce Cakebread's idea of intensity gravitates toward ripe grapefruit and dry hay or cut grass. For the Cakebread Cellars blend, about half the Sauvignon Blanc grapes are grown at the winery's home vineyard in Rutherford, CA. One adjunct parcel in Oakville has heavier soil and contributes a grassier component.

"Another vineyard in St. Helena, with lighter soil, offers citrus and

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Mark Beringer, vice president, production
Duckhorn Vineyards
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Malcolm Seibly, winemaker
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Co Dinn, winemaker of white wines
Hogue Cellars
Prosser, WA

Mark Stupich, assistant winemaker
Kenwood Vineyards
Kenwood, CA

David Noyes, winemaker
Kunde Estate Winery
Kenwood, CA

Paul Brasset, winemaker
Pezzi King Vineyards,
Healdsburg, CA

Michael Scholz, winemaker
St. Supéry Vineyards & Winery
Rutherford, CA

melon qualities," Cakebread explains. "Characters we think of as intense are very vineyard specific rather than regional. Intensity is primarily related to soil type and then secondarily affected by climate."

Mark Stupich says Kenwood Winery walks the intensity line between melons, when grapes are riper, and cut grass and other herbaceous tones, with less-ripe fruit. "We associate grassiness with heavier soils and cooler regions. We try to mitigate this and have moved the Kenwood style toward more melon intensity. Leaf removal has been a primary factor in reducing herbaceousness and ripening fruit better."

Though located in Kenwood, CA, the winery receives Sauvignon Blanc from 21 vineyards scattered throughout Sonoma County and therefore has a broad spectrum of flavors with which to work. Over the last several years, Kenwood has chosen to move from a less aggressive grassy, herbaceous style to one with melon intensity.

"But the 1997 Sauvignon Blanc comes across slightly more herbaceous than what we've made in the last few years," Stupich continues. "Part of the reason is that we wanted to make a larger blend, and to do that, we included a more herbaceous vineyard in Carneros. But we won't deny that there's been market success with brands such as Cloudy Bay (New Zealand), and we have edged it over to that style a little with the 1997 release."

Michael Scholz at St. Supéry (Rutherford, CA) describes Cloudy Bay as "aggressively herbaceous" and says of late, he's noticed that winery's style has backed off some. "I see the wine moving more toward grapefruit intensity. New Zealand Sauvignon Blancs typically show significant grass character."

Stupich notes that much of Kenwood's leaf removal philosophy comes from Dr. Richard Smart and his touting of the open canopy system. He suggests that this influence may also contribute to the noticeable change in Cloudy Bay style.

Bringing in the Washington state perspective, Co Dinn (Hogue Cellars) focuses on the grapefruit and melon intensity spectrum, but adds peach, as a sign of physiological ripeness.

"We'll always get herbaceous characters to some degree," Dinn notes. "But when sourcing, we are doing everything to minimize this, primarily by water management. In Washington, we don't get bell pepper, but more green bean. Through effective water management and leaf removal, we've been able to shift this to riper grapefruit, peach, and guava.

At Guenoc (Middletown, CA), the top-of-the-line Sauvignon Blanc, Langtry Meritage, is made from estate-grown fruit. Winemaker Malcolm Siebly notes that Lake County has a more grassy, herbal Sauvignon Blanc reputation into which Guenoc Valley

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doesn't quite fit.

The Guenoc style is at the riper peach/melon end of the spectrum and away from green notes such as sugar snap peas. Because soils are deeper, there's a slight residual of herbal characters, but more in the form of fennel and anise. The vineyard also contributes a noticeable mineral or wet stone touch.

"We try to minimize the citrus/grapefruit qualities if we can," Seibly says. "They stick out and grab attention, but we're not looking for that."

David Noyes at Kunde Estate Winery (Kenwood, CA) produces an estate-grown Sauvignon Blanc showing grapefruit flavors that evolve toward white peach before bottling. The vineyard location on the valley floor and foggy mornings give a slight herbal note also.

Kunde plans a second Sauvignon Blanc bottling from the 1998 harvest. In contract to the current release, Noyes barrel-fermented a portion of the more intense Sauvignon Blanc in about 50% new oak. "We currently blend 15% to 20% Semillon for richness and viscosity and 4% to 5% Viognier for increased floral aromatics," says Noyes. "This blend of varietals is key to our current style. The blend gives intensity to the fruit; both the hillside Semillon and the Viognier moderate a tendency toward a vegetal leanness of our Sauvignon Blanc. "

Pezzi King (Healdsburg, CA) Sauvignon Blanc comes from two vineyard sources. The vineyard in Dry Creek Valley (on the border with Russian River Valley) is cooler and is hallmarked by grapefruit zest and citrus characters. The Alexander Valley vineyard is warmer and delivers more tropical fruit and melon qualities.

"Both vineyards are mature and that helps intensity factors," Pezzi King winemaker Paul Brasset explains. "Blending the two vineyards offers complexity and intensity of a broad spectrum of aromas and flavors. Because 80% of the wine is tank fermented at 55°F, all bright fruit elements are retained."

Mouthfeel — an intensity factor

Mark Beringer at Duckhorn (St. Helena, CA) notes that they are also moving away from green/grassy and pushing melon and intense fruit. "But we also think of intensity as heightened viscosity impacting mouthfeel. We're treating Sauvignon Blanc more like Chardonnay, without necessarily going full tilt with barrel fermentation and malolactic fermentation (MLF). To retain fruit and build mouthfeel, we do extended lees ageing, sometimes with stirring.

"Progression of a wine across the palate is an intensity factor. A big or intense wine has an entry, a rich middle, and a lingering finish," Beringer contends.

Scholz points to the broad variability among styles of Sauvignon Blanc in California. He agrees that viscosity and palate weight are important to consumers of California-produced Sauvignon Blanc.

New vineyard practices

"New rootstocks (used with replantings due to phylloxera) require different irrigation schemes," Cakebread suggests. "We're experiencing different growth and ripening patterns. Right now, we're just trying to unlock these for each replanted parcel."

Cakebread attributes new patterns to the rootstock and not the scion wood. When Cakebread replanted Sauvignon Blanc in 1991, only clone #1 was available (but others are now). To diversify the sites, three rootstocks 101-14, 3309, and 110R (for light, well-drained soils) were selected.

The water management regime leans toward making sure that vines get the water they need — not irrigating early, but doing maintenance-type irrigation as the season progresses.

"We're finding that Sauvignon Blanc is ripening earlier on the rootstocks we've chosen," Cakebread reports. "The biggest challenge is to extend the maturity. In Napa Valley, we can count on a blast of heat in early August that causes a rapid gain of sugar, which does not always mean an advance in physiological maturity.

"The issue with intensity is how to create the window where sugars are in line with fruit maturity. The width of the window depends on the year.

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Vintage 1997 had a narrow window, but 1994 was wider. This is the whole game for Sauvignon Blanc! This is why cooler years make better wine because fruit is not blown off by heat."

New plantings at Andretti Winery (which have not yet come into bearing) were made using SO4 rootstock in deeper soil and 110R in shallow soils. UCD clone #1 is the scion wood. Plantings are so new that the trellis has not yet been chosen, but Pepi is leaning toward a split canopy.

Acidity and picking parameters

In some years, Sauvignon Blanc drops acid before physiological ripeness is achieved. In general, winemakers interviewed dislike adjusting the acid level in the winery.

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"We don't look at acid levels by numbers," Cakebread contends. "Numbers can be a guideline, but we are making decisions based on flavors."

Added to this is the issue of high alcohol levels. Semillion which ripens at lower Brix levels (as low as 19° or 20°) is a good blending tool to bring down the wine's alcohol level and add a melon character. Because the pH of Semillon is around 3.3, it also aids in overall acid balance.

For all these reasons, Duckhorn blends with Semillon almost to the legal maximum. "Additionally, while we're speaking of intensity, we're also leaning to styles of Sauvignon Blanc that are more delicate," Beringer suggests. "Higher alcohols are more noticeable in Sauvignon Blanc styles with finesse. Grassy styles easily hide higher alcohols."

Dinn notes that Semillon grows well in Washington state. At Hogue, the best Semillon goes into the varietal bottling, but the Hogue Fumé Blanc is 20% to 25% Semillon for a richer mouthfeel.

Brasset notices that when he's sampling, there's a certain point where the berries become slip-skin. When that happens, he knows it is getting close to harvest. The final decision is based on flavor, acid, and pH.

Vine management

Because hillsides have been generally reserved for red varietals, Sauvignon Blanc is grown in more fertile valley-floor soils. This factor is only one of many affecting yields.

What crop load can Sauvignon Blanc handle?

"That's a good question," Pepi responds. "In the mid-1980s on very fertile soils, I was dropping 25% to 30% of the crop and still handling 10 tons/acre (TPA) on Geneva Double Curtain (GDC). To balance the vine, this was not out of line.

"But it all depends on the site. If cropping is too low, you tend to get more herbaceous leanings. It also depends on canopy, and I'm a strong believer in canopy management and proper trellising.

"I view leaf pulling as a bandaid approach, which isn't to say that I don't do it. But if you've got the proper trellising for the site, you shouldn't have to leaf pull. In some years, even with the

proper trellis, the vines may create more canopy and then manipulation is necessary.

"The way canopy is managed, to a large extent, dictates the varietal characters and intensities of Sauvignon Blanc."

To back away from mono-cultural farming and add the diversity element for enhanced complexity, Cakebread's new plantings are on both GDC and vertical trellis (VSP). Because plantings are still so young, Cakebread shies away from stating which characters emanate from GDC and which from VSP. He does, however, say that GDC crops between 6 and 7 TPA and it appears that VSP (which has just come into full production) will be slightly less.

Dinn cites that at one point many Washington state growers converted to VSP, but with the inherent vigor of Sauvignon Blanc, it was nearly impossible to contain all the shoots and vigorous growth with this trellis.

"With a T-trellis, shoots can be spread out for better air circulation and fruit exposure, but leaf pulling is necessary," explains Dinn. In Washington state, canopies generally are not split because of potential freezing and resultant retraining. Smart-Dyson training is being tried.

Washington state growers tend to stick with a bilateral cordon and that gives rise to a significant number of shoots/meter. This has been handled by spreading out shoots and managing water. Shoot length can be managed by water application, but when shoot density is tight, it needs to be spread out.

In the ideal situation, water management (monitored by neutron probes) extends the growing season while simultaneously giving time to harden wood before the first cold snap.

"As the water content of the soils drop, we wait until it gets down to a level where shoot growth stops and wood starts to harden," Dinn explains. "We are achieving this in many of our vineyards. Then, it's a matter of balancing the crop load, so ripening does not occur too early and desired sugar accumulation matches the season."

All St. Supéry Sauvignon Blanc is from Pope Valley, which Scholz considers a warmer area yielding grapefruit and melony fruit characters. To achieve multiplicity of aroma and flavor, parcels are not harvested at the same time. Ripeness levels in various vineyards are more soil dependent than on trellis or any other viticultural element.

"St. Supéry's marketing research suggests that our consumers prefer a grapefruit-melon style," Scholz remarks. "Therefore, I'm picking on flavors and looking to produce a wine that is not too grassy. But from the point of intensity, I'm focusing on viscosity, which is achieved with ripeness. Sometimes, this can be a trade-off with alcohol hotness, but you're always walking a fine line in achieving balance within the style."

Over the last several years, Guenoc's Langtry Meritage has been 80% Sauvignon Blanc and 20% Semillon. The Guenoc Sauvignon Blanc with a North Coast appellation (Potter Valley, Lake County, and estate grapes) has the

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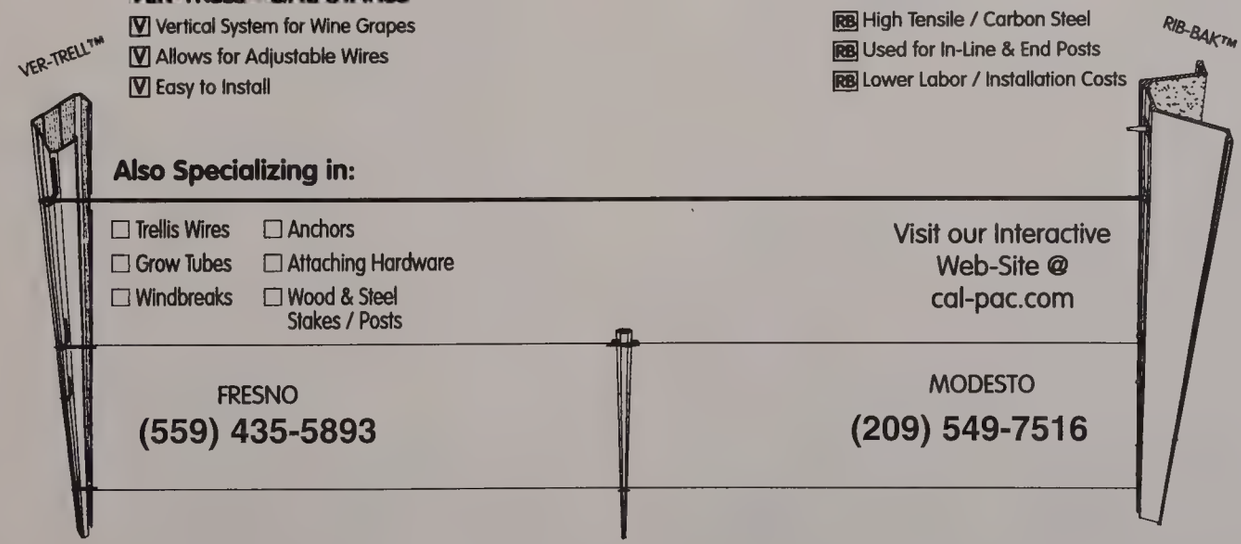

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same percentages, but the difference is vineyard locations and therefore, various soil types and microclimates.

Langtry Meritage is estate-grown and carries Guenoc Valley as an appellation. Soils are heavier and retain moisture. In replanting, rootstocks handling wet feet better are being selected.

To establish differences among the wines, the Langtry Meritage is 100% barrel fermented with a significant percentage of new oak. The Guenoc Sauvignon Blanc is barrel fermented, but in only ⅓ new oak. "As we're able to source more fruit consistently, the Guenoc Sauvignon Blanc program is growing," Seibly reports.

Commitment to style

"People may think that St. Supéry has made a style change for Sauvignon Blanc," Scholz acknowledges. "But I don't think that's true. We've just worked a lot harder to make our wine more intense.

"The qualities that were in St. Supéry are the same. If there has been a change, it's that we're allowing our wine to move to the market a little earlier (release in March following harvest). Perhaps that's being viewed as a style change because the consumer can now drink it as a young, fresh wine.

"Of all white varieties, it is most important that Sauvignon Blanc showcase intensity of flavors. This of course, depends on vineyard practices, but the key element has already been stated by Bruce Cakebread as the 'window' of optimum flavors. A winemaker needs to know what this is for the various vineyard sources.

"A producer needs to make a commitment to style. If barrel fermentation is the choice, obviously the wine cannot be in the market four months post harvest."

The to-market-early concept of St. Supéry is countered by Duckhorn, where Sauvignon Blanc is bottled in March post-harvest and released six months later.

Currently, Kenwood believes that 23° Brix is too ripe for Sauvignon Blanc. The target is 22.8° Brix for the overall blend. In cooler region vineyards, Brix levels are allowed to go higher to bring herbaceous characters into the melon spectrum.

Stupich refers to the Kenwood style of Sauvignon Blanc as one with "fruit snap." It is designed to be distinctly different from the winery's barrel-fermented style of Chardonnay, where 24° Brix is a common goal.

Whole-cluster pressing

Starting with the 1997 vintage at Kenwood, whole-cluster pressing became an option with the availability of a tank press at Kenwood's sister facility, Valley of the Moon. Vineyard lots were split to assess the impact of whole-cluster pressing compared to the "traditional" Kenwood method of destemming and crushing.

The first difference noticed was that whole-cluster pressing allowed only half the throughput per press load of

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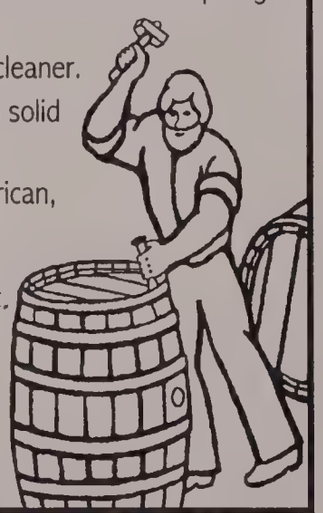

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destemmed fruit. Second, solids were only 2% after 48 hours settling at 48°F. In 1998, settling time was reduced to 24 hours.

Because Sauvignon Blanc needs larger amounts of bentonite to become heat stable, Kenwood added two pounds/1,000 gal to the whole-cluster-pressed juice. This is two pounds/1,000 gal less than the amount previously required to achieve heat stability yet was enough in some cases. The pre-fermentation bentonite addition also helped to achieve very compact lees.

Whole-cluster pressing also reduced the need for rough filtration in half the lots. While reducing the O_2 contact with juice at the press, Stupich doesn't believe that this strongly affected the overall quality of the wine by taste. In 1997, however, Kenwood did not compare levels of phenols between whole-cluster and traditional pressing methods.

"Once it was time to put the final blend together, there was very little organoleptic difference between the wines that were whole-cluster pressed and those that were not," Stupich reports. "Whole-cluster pressing did not stand out on the basis of quality compared to the way Kenwood has been pressing Sauvignon Blanc before.

"When you need to get a large volume of grapes through a press, that's not the day to whole-cluster press. But whole-cluster pressing is a way to save some steps down the road."

Pepi also comments that whole-cluster pressing is beneficial for vineyards with a tendency to develop astringency or bitterness.

Beringer queries whether ageability is sacrificed with whole-cluster pressing. But the answer produces another question: Is Sauvignon Blanc a wine for which long-term ageing is a consideration? Winemakers agree that the bulk of their Sauvignon Blanc is consumed early, so ageability is not an issue.

Dinn suggests that the best manager of phenolics is timing of the press cut. It is not done based on pH or color. It is purely a taste perception decision.

"Pragmatically, the unfortunate element of this theory is that by the end of the blending, most of the press wine has been added back to the blend," Scholz remarks.

Fermentation decisions

Tank fermentation is practiced at Kunde for the bulk of production. Older, neutral French oak barrels are used to ferment a small amount (10% to 20% of total volume). For a period of seven to 10 days, all the clean-racked wine, none of which undergoes MLF, is run through new French oak barrels going into the red wine program.

Hogue Cellars practices a similar regime with 50% fermented seven to 10 days in new oak, the remainder in tank.

In the past, Guenoc Sauvignon Blanc was 100% barrel fermented in new oak, but that was mainly because it was primarily Langtry Meritage that didn't make the cut. Currently, and due to increased sourcing of Sauvignon Blanc

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grapes, Seibly is moving away from 100% barrel fermentation to ⅓ to ½ barrel fermentation in 50% new barrels for the Guenoc bottling. The blend is evaluated and may go back into barrels (as a blend) for a few weeks prior to bottling. This emphasizes the varietal fruit intensity while still providing the complexity and mouthfeel contributed by barrel fermentation and ageing.

Langtry Meritage is fully barrel-fermented in half new and half one-year-old barrels, predominately French oak.

At Duckhorn, 30% to 40% of the wine is barrel fermented in new French oak and left to age on the lees for three to four months. The balance is aged on lees in-tank. Stirring is an option practiced as a vintage dictates. In some years, after barrel-fermented portions are removed, tank-fermented wine gets transferred to barrel for a short time to develop mouthfeel and viscosity.

During the wine tasting following the general discussion, the winemakers agreed oak perception is also an element of intensity, provided it is in total harmony with the perceived style.

Assessing intensity

Flavor intensity is closely related to complexity. Winemakers interviewed are united on the point that the first element for producing a flavor-intense Sauvignon Blanc is knowledge of the fruit source. Understanding flavor development and physiological ripeness for a particular site is also critical. Once these are known, a flavor-intense style established in the vineyard can then be gently nudged to a wine style by fruit handling and cellar techniques, which may or may not include time in oak cooperage. ■

PWV thanks St. Supéry Vineyards & Winery for hosting the discussion/tasting.

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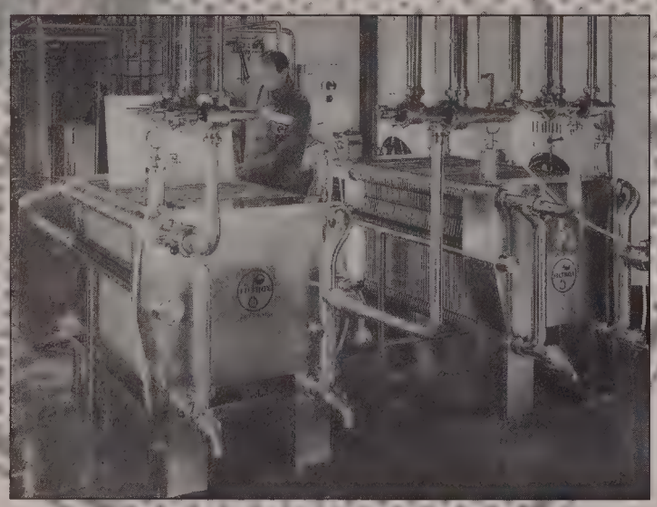

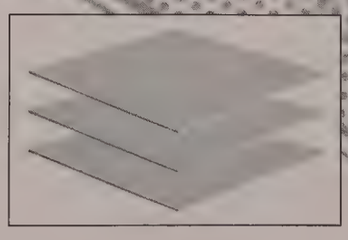

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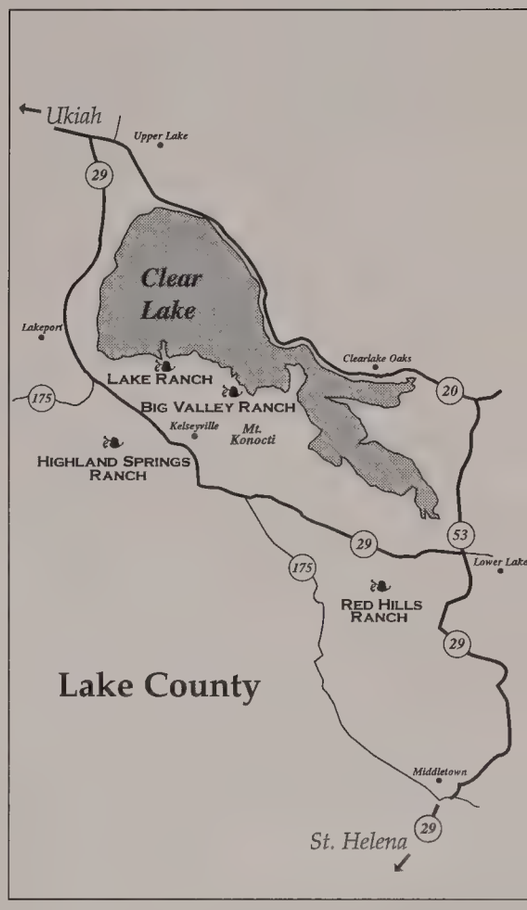

by Carolyn Dempsey

With 150 acres of Sauvignon Blanc divided among vineyard blocks in several vineyards, Roumiguiere Vineyards in Lake County, CA, faces many viticultural challenges. Each vineyard site, soil, and climate introduces variables that must be addressed specifically in order to produce the best grapes possible. What are the challenges of growing Sauvignon Blanc on different sites, and how have the Roumiguieres addressed them?

Part of the North Coast AVA, Lake County tends to be a vigorous growing region for Sauvignon Blanc because of high daytime temperatures and low evening temperatures, according to vineyard operations manager John Roumiguiere. "Large temperature swings agree with Sauvignon Blanc," he says. "But there are still key decisions to make regarding growing Sauvignon Blanc grapes on different sites. Trellising and vine spacing are two very important considerations."

First planted with vineyards in the 1870s, Lake County had nearly 20 wineries and about 7,000 vineyard acres in the early 1900s. The county's wine industry disappeared during Prohibition, however, and did not reappear until the mid-1960s.

Today, there are five wineries in Lake County, and vineyard acreage has grown to more than 3,700 acres and is expected to double within the next few years. Growers are producing grapes of discernible quality, primarily Cabernet Sauvignon, Sauvignon Blanc, Chardonnay, Merlot, Zinfandel, Riesling, and Syrah. As a result, wineries outside Lake County are turning to the Lake County sub-AVA as a source for premium North Coast AVA winegrapes.

In the early 1970s, Bob Roumiguiere bought 60 acres in Lake County to start Roumiguiere Vineyards. As the business grew and Roumiguiere acquired more properties, sons Rob and John joined the company. Today, John runs the vineyard operations, and Rob manages the business operations.

Of the family's 600 acres, approximately 500 are planted to vineyards, producing Sauvignon Blanc (150 acres), Cabernet Sauvignon (130 acres), Chardonnay (73 acres), and Merlot (65 acres), along with small amounts of Muscat Canelli (10 acres), Cabernet Franc (five acres), and Sangiovese (one acre).

Roumiguiere Vineyards sells Sauvignon Blanc, Cabernet Sauvignon, and Muscat Canelli grapes to Robert Mondavi Winery; Chardonnay and Merlot to Dunnewood (a Canandaigua-owned winery in Mendocino County); and Sauvignon Blanc to Kendall-Jackson and Buena Vista Winery.

"We have a unique working relationship with each winery client," explains Rob Roumiguiere. "They all have different requirements for sugar levels or when to pick. Our goal is to produce quality fruit and to meet the expectations of each winery. "We work closely with them throughout the year and during harvest," he says. "We meet with the wineries, taste the wine made from our grapes, and review them with the winemakers. We strive to give them the fruit they want."

Buena Vista winemaker Judy Matulich-Weitz sources a minimum of 75% of the grapes for her winery's Sauvignon Blanc from Lake County; about 50% are supplied by Roumiguiere Vineyards. Of the grapes from outside Lake County, more than 20% are from French Camp Vineyards in San Luis Obispo County, and less than 5% are from the Carneros estate in Sonoma County. The winery produces between 80,000 to 100,000 cases annually depending on the vintage.

In an effort to encourage growers to produce the highest quality grapes possible, Buena Vista contracts for Roumiguiere grapes based on acreage rather than tonnage. As a result, the Roumiguieres are able to accommodate the natural yield levels in their vineyards, maintaining an optimum crop load. "The growers are the best judge of what crop load their vineyards can handle," says Matulich-Weitz. "They want the fruit to be in the best condition and optimum ripeness just as we do. Consistency is crucial for Lake County growers."

In the vineyards

Roumiguiere Vineyards supplies Buena Vista Winery from five vineyard blocks, including M, Q, 1104, 1105, and 1106. The M and Q blocks are the largest blocks in the Highland Springs vineyard, where there is variant clay soil with drained loam in a stratified substratum. The M block is 26.4 acres of SO4 rootstock on a single vertical curtain trellis, and the Q block is 19.5 acres of Freedom rootstock on an open lyre trellis. Both are spaced 9.9x7.3ft. to maintain consistency for equipment access.

The other three blocks are in the Big Valley Vineyard, where the soil is Cole clay loam with drained and Lupoyoma silt loam. The 1104 block is 7.6 acres, 1105 is 4.9 acres, and 1106 is 4.4 acres. The spacing is 12x8, and the trellis system is double vertical. While these three blocks all have 5C rootstock, the 1104 block also has Freedom, 110R, 3309, and 5BB.

The Roumiguieres calculate their Highland Springs vineyard yield to be between seven and nine tons per acre, while the Big Valley vineyard produces nine to 11 tons per acre.

Since Sauvignon Blanc is a big vigorous vine with large yields, Roumiguiere Vineyards provides ample spacing to give each vine enough room to grow without becoming overly vegetative. "If you don't give the vine enough room, it spends more energy on wood growth and less on maturing the fruit," says John. "If there's too much room, there will be too much fruit on the vine and not enough wood and leaves which are needed to mature the fruit. Vine spacing is critical to attaining the vine balance that we strive for. Vine balance with prime fruit to wood ratio is also the basis on which we make our trellising, rootstock, and clone choices."

After vine balance and trellis spacing, secondary considerations, such as mechanization, are addressed to adjust to a dwindling labor supply. If the fruit will be going to a winery that permits mechanization, the Roumiguieres space the vines to accommodate their vineyard machinery.

John contends that mechanization raises important trellising issues. "Neither open lyre nor twin vertical curtain trellis is very compatible with mechanization. On the other hand, a single vertical curtain trellis is not a very good choice for an extremely vigorous vine like Sauvignon Blanc. A single vertical curtain is used more successfully for lower vigor sites with lower vigor varietals that can handle more exposure, such as Cabernet Sauvignon."

"We have started using the Smart-Dyson trellising system, in which shoot positions are directed straight upward and straight downward. Pointing shoots downward is a departure from tradition; however, it increases yield per acre, while actually taking up less space and without increasing yield per vine. This system also permits easy mechanization. Almost all of our trellis-

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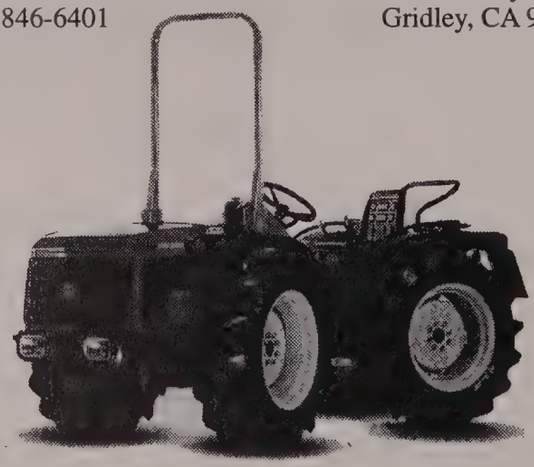

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ing involves shoot positioning and canopy manipulation."

Roumiguiere's vineyard practices are also influenced by other factors, such as the depth and water-holding capacity of the soil at any given site, the site's microclimate, and whether the vines will be threatened by frost. Trellising, spacing, and pruning to adjust crop load also contribute to improved fruit quality.

"The real challenge for the grower, in my mind," says John, "is selecting the right site and understanding the potential of the soils of that site. In other words, the grape variety is chosen because it's appropriate for that particular site, not because of what the winemaker wants." Rootstock is chosen according to site potential, whether the soil is subject to drought or waterlogging, and whether it is deep and fertile or shallow and infertile.

Further vigor and spacing considerations include the level of competition among vines and that some scion wood might be less compatible with certain rootstocks. John chooses rootstocks "mainly according to soil type, fruiting capacity, and maturation rate. We look at the historical fruit maturation rate of the rootstock. Also important is tolerance to phylloxera, nematodes, wet feet, and drought conditions."

Roumiguiere Vineyards' vineyard management program includes integrated pest management (IPM) techniques designed to eliminate destructive vineyard pests and promote good conditions for beneficial insects. These include cover crops and promoting habitats for falcon and spider denizens in and around the vineyards, because they prey on undesirable pests, according to John.

He cites additional benefits of cover crops, including erosion control and promotion of good soil conditions "to allow better root and water penetration and exchange of nutrients and for reduced soil compaction. Cover crops we use are Max organic (grasses, legumes, cereals), crimson clover, rose clover, and perennial grass mix to control and choke out undesirable weed species that are in direct competition with vines for water and nutrients. These weeds are also undesirable for mechanical reasons, for example, morning glory is very stringy and will grow up and around a vine if you let it."

Another method of vineyard management that Roumiguiere uses is soil and plant tissue analysis. "Along with IPM," John points out, "analysis gives us the information we need to decide when and how to fertilize the vines. We do most of our fertilization through drip systems because they are accurate and efficient. We also apply micronutrients by foliar application, such as calcium, manganese, copper, boron, or zinc, according to what is needed. For fertilizer, we like to use Ultra Gro, which is soluble and works well with drip irrigation. Our soil additives include gypsum, lime, and sulfur."

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Roumiguieres. "Lake County is not known for having a high incidence of mildew, because it doesn't thrive or spread in the high temperatures here," explains John. "However we do have a powdery mildew program. For any mildew control that is necessary, we use dusting sulfur and micronized sulfur, and in conjunction with those two, we use sterile inhibitors."

Because of the low incidence of mildew problems, the Roumiguieres find they don't need to do much leaf pulling on their vines. "To us," John adds, "the need for leaf pulling is almost an indication that something was not done correctly in the first place, because it means that you're trying to get better exposure for the fruit. It indicates that your vines are not in balance. Instead, we focus on shoot positioning and weak shoot removal. In addition, the hot summer sun in Lake County means that too much leaf pulling will overexpose vines, resulting in sunburn."

Harvest

The Roumiguieres' Sauvignon Blanc blocks can ripen weeks apart, despite close proximity of the sites. "Harvest for the M block ran from September 10 to 25 in 1997, while Q was harvested between September 3 and 11 that same year," recalls Matulich-Weitz. Roumiguiere attributes the difference in harvest times to three things: different trellis systems, different rootstocks, and age (M block is two years older than Q block).

The M block has vertically shoot-positioned trellising, which increases exposure of the fruit to sunlight, and John believes it may possibly step up the maturation rate.

Roumiguiere Vineyards lies at the southern end of Clear Lake and the southern end of the county. "Roumiguiere's grapes start coming in usually sooner than other growers' in Lake County," says Matulich-Weitz. "Northern Lake County fruit matures much later than grapes in the southern section."

Fruit flavor is the maturity determinant Buena Vista asks for from the Roumiguieres. Matulich-Weitz looks for a pH between 3.15 and 3.3. "You don't want to pick too early, because then you get too much grassiness and the wine is too tart," she says. "We can hit 23° Brix, which would be very high sugar for Lake County, but 21.5° to 22.5° is the ideal window, with 22° usually preferred."

A lower pH and lower sugar levels manifest themselves in pronounced grassy and citrus characteristics. Matulich-Weitz explains that it's balance that she's after in Sauvignon Blanc. "I don't want it to be grassy, but I don't want it to taste like a Chardonnay. We use no oak and want to emphasize the complex fruit flavors of the variety. Grassy is part of the mix but should not be the only character of the wine. By using Lake County fruit, we get a great mixture of flavors and aromas."

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No matter what the tonnage, all of the Lake County Sauvignon Blanc destined for Buena Vista Winery is handpicked. Long-distance transit can be a problem with mechanically harvested grapes because machine harvesting is rougher on fruit, Matulich-Weitz contends. "We tried it one year with Roumiguiere grapes, and we all agreed to stop very quickly once we saw the fruit and the analysis. The grapes were broken when the fruit was machine picked, and we got juice contact with the skins for too much time. The pH of the juice rose, and the quality of the juice was diminished. When we did mechanical harvesting, the pH on the free run went up to 3.5, this was just too high for our style of wine."

Once the grapes arrive at Buena Vista, Matulich-Weitz puts them into the press whole cluster and lets them drain for about a half-hour before starting to press. "That's the key," she says. "We drain the free run off and then press up to a maximum of 0.6 bars pressure. We are able to get the same juice yield at this low pressure, but we keep the pH low.

"Our free run averages around 150 to 165 gallons per ton, and then the balance is extracted by gentle pressing. We monitor the pH from the beginning to end. If we start to see the pH rise, we will take a press cut to a separate tank. Otherwise, it all goes into one tank, free run and light press."

Buena Vista doesn't continue pressing the grapes until they're squeezed dry. The press cycle averages 90 to 120 minutes including the half-hour of draining. The final average yield out of the press is 175 gallons per ton and about 165 gallons per ton after settling and racking off the juice solids.

Winemaking philosophy

Matulich-Weitz describes the Sauvignon Blanc bottled by Buena Vista in terms of melon, stone fruit, tropical fruit, pears, and grapefruit. "Lake County grapes give our Sauvignon Blanc its specific flavors. Each vineyard adds a different character, but there is a common thread among Lake County grapes. Lake County grapes are very different from grapes in other areas." She elaborates, "The nights are cold, the days are warm, and we are able to get ripe flavors at lower sugars, and this gives the fruit very distinct characters.

"Upper Lake County vineyards produce higher acid levels, resulting in grass and pear notes. The southern Lake County vineyards, such as Roumiguiere's Q block, are known more for grapefruit character. She describes Roumiguiere's M block, though, as having a clean, mellow character redolent of gardenia and jasmine — "white flower" as she calls it. "Each year the flavors are slightly different

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in each vineyard, but the sum of the pieces makes for a consistent style each year."

John Roumiguiere agrees, adding that as a grower, "I'd love to say we can control our grapevines completely, but we are at the hands of Mother Nature. Even if a vine is in the same location and we treat it the same each year, there will still be differences in the fruit from year to year."

"The Roumiguieres work very hard at balancing their vines," concludes Matulich-Weitz, "always asking themselves what their vines can handle. How can we do it better? 'Is there something more we can do?' Lake County is a newer area of growers. Buena Vista has a long-term commitment to Lake County and to its growers. If the winery and the grower work together, we can make the best wines and they can grow the highest quality and quantity of fruit." ■

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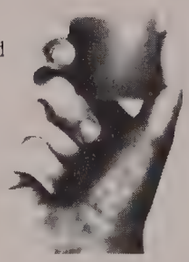

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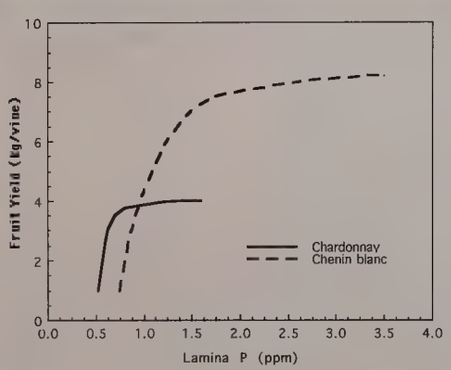
Managing phosphorus deficiency in vineyards

by R. Stanley Grant, Viticulturist, Duarte Nursery, Inc.

In the early 1980s, UC Davis professor James A. Cook and co-workers first observed phosphorus (P) deficiency in California North Coast hillside vineyards and the foothills of the Sierra Nevada.[6] Affected vines were discovered with stunted shoot growth, poor fruit set, and characteristic leaf symptoms. Research and field experience have since increased our understanding of and ability to manage low levels of phosphorus in vineyards.

Phosphorus deficiency in grapevines inhibits the initiation and maintenance of fruit clusters and flowers within developing buds.[17] As a result, fruit yield from P-deficient grapevines is reduced.[15,17] Vine growth, whether measured as leaf area, shoot weight, or weight of dormant season prunings, is also reduced by phosphorus deficiency.[7,15]

Figure I
Effect of leaf blade phosphorus concentration on fruit yield for Chardonnay and Chenin blanc grapevines.[15]



Late in the growing season, leaves on the lower part of shoots of severely P-deficient vines develop characteristic symptoms. These include yellow patches between the veins on white fruited varieties and red patches between the veins on red fruited varieties.[6] Initially the patches are most numerous near the edges of the leaves, but increase in number inward with time. All these effects of phosphorus deficiency are due to disrupted biological processes, including the synthesis of molecules, energy transfer, and photosynthesis.[10]

Many California North Coast and Sierra foothill soils are more highly weathered than in drier portions of California. Weathering occurs when rainwater moves through the soil and removes the components of soluble minerals, including many plant nutrients. In these higher rainfall areas, greater weathering, in combination with the additions of greater quantities of plant matter to the soil, results in soil acidification (pH less than 6.0).

Acid soils are favorable chemical environments for reactions that fix phosphorus, making it unavailable to plants. Grapevine phosphorus deficiency occurs under these conditions.[1,9,14]

Many acidic soils have phosphorus concentrations lower than 8 ppm by the Bray 1 test. Under these conditions phosphorus deficiency in grapevines is likely to develop. Other methods, such as the Olsen bicarbonate test, are used to evaluate the phosphorus concentration of soils, but the Bray 1 test is the most reliable for acidic soils.

Soil series that include soils of low pH

Table I
Composition of selected phosphorus fertilizer materials.[3,19]

Fertilizer material	Phosphoric acid anaylsis (% P_2O_5)	Phosphoric anaylsis (% P)	Total available phosphorus (%)
Raw rock phosphate	25-41	11-18	14-65
Defluorinated phosphate rock	21	9	85
Magnesium silicate phosphate rock	23	10	85
Phosphoric acid[z]	52-54	23-24	100
Superphosphoric acid[z]	76-83	33-36	100
Single superphosphate	18-20	8-9	97-100
Triple superphosphate	45-46	20	96-99
Monoammonium phosphate[z]	20-61	9-27	100
Diammonium phosphate	46-48	20-21	100
Ammonium phosphate-sulfate	20 or 39	9 or 17	100
Ammonium phosphate-nitrate	12	5	100
Ammonium polyphosphate[z]	35-62	15-27	100
Urea-ammonium phosphate	16-42	7-18	100
Urea phosphate	44	19	-
Monopotassium phosphate[z]	51-52	22-23	100
Dipotassium phosphate	41	18	100
Potassium polyphosphate	51	22	100

[z] Some or all fertilizers materials of this type are suitable for drip irrigation. Verify suitability with fertilizer supplier before using.

and low phosphorus are the Aiken, Manzanita, Musick, Pentz, Redding, and Sobronte. Grape growers developing vineyards in acidic, low phosphorus soils will likely need to apply fertilizers containing phosphorus.

Fumigation of a low phosphorus soil can increase the difficulty of acquiring phosphorus by grapevines. Most soil fumigants are biocides that indiscriminately kill the living organisms they contact, including mycorrhizae.[11] Mycorrhizae are a group of naturally occurring fungi that infect roots, increasing the nutrient-absorbing capabilities of the host plant.[18] Inoculation of young grapevines in fumigated soil with selected mycorrhizae may result in infection and increased vine growth, but introduced fungi are generally not as effective as native fungi and recovery from fumigation is usually not complete.[16]

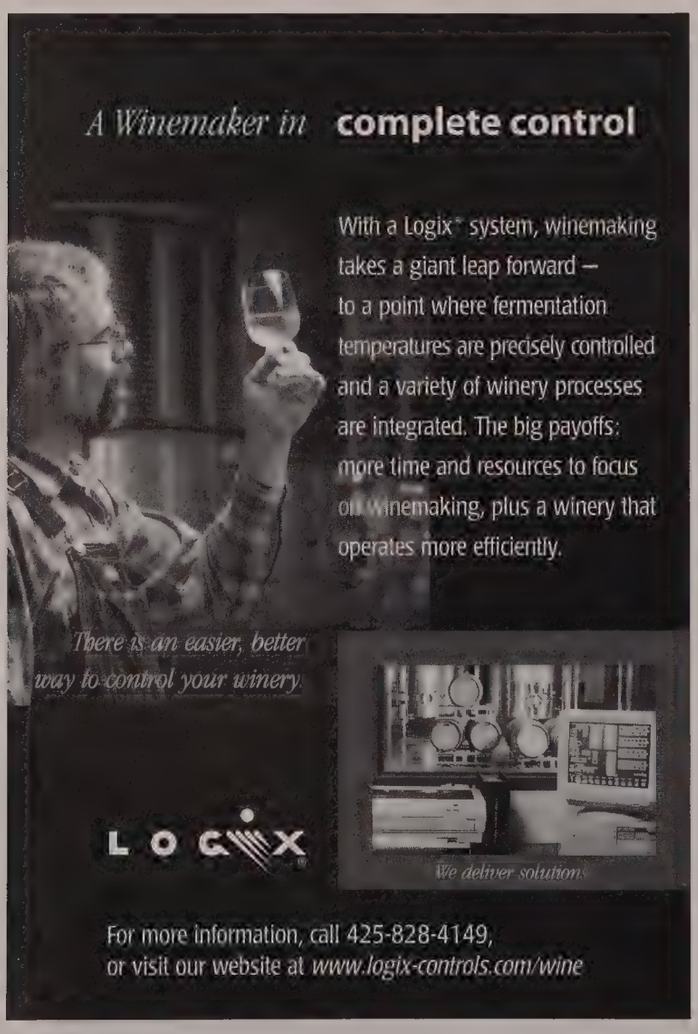
Cook and his co-workers collected petioles from leaves opposite clusters during bloom. They found phosphorus concentrations between 0.04% and 0.07% (400 to 700 ppm).[6] In California, phosphorus concentrations in petioles during bloom normally range from 0.3% to 0.6%,[6] and petiole phosphorus concentrations lower than 0.10% (100 ppm) have been considered deficient.[4] However, recent research indicates that the leaf tissue phosphorus concentration associated with deficiency may vary with scion and rootstock variety.

Ungrafted vines have been shown to generally differ in petiole phosphorus concentrations,[2,5] and the varieties Chardonnay and Chenin Blanc to differ in the leaf blade phosphorus concentration associated with maximum yield (Fig. 1).[15] Scion and rootstock influence the extent that vine growth and leaf area are inhibited by phosphorus deficiency.[7]

In addition, rootstocks differ in their ability to take up phosphorus from the soil, to translocate phosphorus to the scion, and in their influence on phosphorus use efficiency by the scion.[8] These observations suggest that a single leaf tissue phosphorus concentration may not accurately diagnose phosphorus deficiency in all scion-rootstock combinations. Until further research involving several scions, rootstocks, and soil phosphorus levels is conducted, the 0.10% criteria should be used loosely.

Plant nutrients required in large quantities, such as phosphorus, are called macronutrients. Macronutrient deficiencies are usually corrected by applications of fertilizers to the soil. In field trials, applications of phosphorus fertilizer to soils have successfully corrected phosphorus deficiencies.[6,15] Fertilizer was placed on the soil under the drip emitters by hand. Maximum fruit yields were achieved at 0.3 to 0.4-lb phosphorus per vine for vineyards with conventional vine densities.[15] The beneficial effects of the fertilizer declines with time and reapplication becomes necessary after two or three years.

Triple superphosphate and monoammonium phosphate, two commonly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used phosphorus fertilizers, were used in the trials.[15] There was evidence in this and other studies that the nitrogen present in the monoammonium phosphate fertilizer enhanced phosphorus uptake and utilization by P-deficient plants.[19]

The application rates for phosphorus fertilizers are relatively high compared to those used for other macronutrients such as nitrogen. Such high rates are necessary because low pH, P-deficient soils adsorb or fix large quantities of phosphorus. This makes it necessary to apply P-fertilizer in a concentrated band or spot in order to overwhelm the soil's adsorption capacity leaving some phosphorus available to the vines. With lower rates or broadcast applications, most of the applied phosphorus is adsorbed by the soils and not enough is left for the vines.

Lower application rates are required when correcting P deficiency with soluble phosphorus fertilizer applied through a drip system.[12,13] Savings will be realized both in the quantity of phosphorus fertilizer applied and the labor required for application.

Fertilizer may be applied through a drip system at any time during the season until leaf fall, but is probably most effectively applied during the spring and autumn while roots are rapidly growing.

It is essential that only soluble phosphorus fertilizers be applied and that only very low concentrations of calcium and magnesium be present in the water flowing through a drip system while phosphorus is being injected to avoid emitter clogging. When their concentrations are sufficiently high, calcium and magnesium combine with phosphorus to form the solid compounds calcium phosphate and magnesium phosphate. Precipitation of these compounds can be avoided by acidifying the irrigation water, which is accomplished through injection of acidic fertilizer or simultaneous injection of acid and fertilizer.

Many growers inject sufficient acid to lower the irrigation water pH between 5.5 to 6.0. Fertilizer is normally applied during the middle of an irrigation set to allow prewetting of the soil prior to the application and flushing of the drip system following the application.

Rock phosphate, the raw material from which commercial phosphorus fertilizers are made, is commonly used by organic growers to correct phosphorus deficiencies because other fertilizers accepted by organic certifying organizations contain much less phosphorus. (Examples of other phosphorus-containing fertilizers accepted by organic-certifying organizations include compost, bone meal, and kelp-based fertilizers.)

Rock phosphate will not be effective in correcting phosphorus deficiencies if it dissolves too slowly, allowing much of the phosphorus to be adsorbed by the soil and leaving little phosphorus for the vines.

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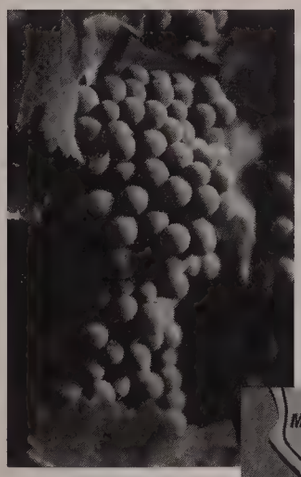

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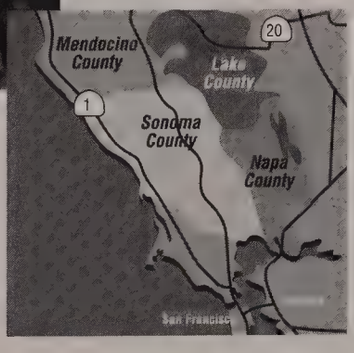

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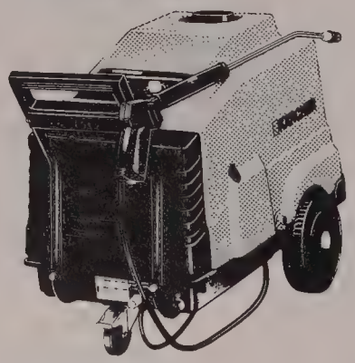

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from apatitic phosphate rocks containing a high percentage phosphorus (see Table I), finely ground, and applied at very high rates (two to three times higher phosphorus rates than conventional phosphorus fertilizer) in a concentrated band or spot.[19] Rock phosphate has the disadvantages of uncertain effective phosphorus concentration and rate of release, and the inconvenience of greater bulk and dust compared with conventional phosphorus fertilizers.

Regardless of the type of phosphorus fertilizer, it is beneficial to apply it to low-P soils in advance of planting a new vineyard to allow it time to saturate the soil's P-adsorption capacity and become available for vine uptake. This is most easily accomplished by shanking dry fertilizer adjacent to the vine row or injecting liquid fertilizer through the drip system. Hand application in the planting hole is more costly and may result in young, tender vine tissues coming into direct contact with concentrated fertilizer. ■

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Roll out the barrels

In this new column, we will be discussing wood and wine. More specifically, we will be discussing how you can make more flavorful, more balanced wines with a more thorough understanding of wood and wine.

The focus will be on oak barrels and how they affect wine quality. Of course, oak barrels are not the only option available to winemakers; the last few years have seen a virtual explosion of oak alternatives, and these too will be explored.

Background

For background information about myself, I am managing partner and winemaker for Domaine Archer, a small winery located in the Russian River Valley of Sonoma County; our focus is on vineyard designated Pinot Noirs and Zinfandels.

Prior to working at the winery full time, I worked for almost three years at a French cooperage in the Napa Valley. I was a combination account manager and research enologist. My job was to visit wineries throughout California, help with their barrel needs, taste barrel samples, and coordinate winemaking experiments.

As a result, I visited nearly 300 wineries and winemakers! I got to know, on an intimate level, the inner workings of wineries all over California. I tasted thousands of barrel samples, many of them experiments and trials. As a winemaker, I could ask the opinions and strategies of all these other winemakers.

In addition, for the last five years, I have been a member of the California Enological Research Association's (CERA) barrel committee.

This experience has given me a great education. It has also given me an interesting perspective on the use of oak barrels and their alternatives. It is this perspective and experience I will share in this column.

Planning for next harvest

In the first two months of the new year, it seems harvest was just completed a couple of months ago. Yet it is already time to be planning for the next harvest. This is especially true where barrels are concerned.

The worldwide demand for quality wine barrels has been building over the last few years and has never been stronger. For the highest quality barrels, demand exceeds supply and probably will for several years.

Many French coopers have already set allocations for the American market. In some cases, if you're not already a customer, you'll spend time on a waiting list before you'll get on the customer list. Soon, some American oak coopers will also be setting allocations.

The implication here is that, when it comes to ordering barrels for harvest, sooner is better than later. Loyalty to coopers can play an important role in obtaining needed supplies, especially if your production is expanding.

In general, if a winery can place its cooperage order before the end of March, it stands an excellent chance of getting what it requires. After that, unless you're on an allocation or standing order basis, you run the risk of the cooper selling out for harvest.

There are many factors to consider when planning the barrel and oak alternatives purchases for the year. Financial budgets obviously play a key role; however, arriving at a well thought-out budget is no small task. It's rather like the chicken and egg question.

A common approach is to assign a percentage of sales or income to barrel purchases. The problem with that approach is that you're left wondering: "If I spent more on barrels, maybe I could make better wine. If I made better wine, I could sell it for more money, so isn't the barrel budget more an investment than an expense? Such thinking could well lead to a philosophical debate with management, but no one said budget planning was easy.

The wood choices you make for your wines have become a critical factor in wine quality. The options are many and increasing every year. For now, there are a few key issues to be aware of. These include the cooperage evolution, vineyard evolution, winemaking style considerations (*read* marketing), and experimental strategies.

Cooperage evolution

The wood and wine marriage is undergoing tremendous changes. Just as the modern wine business in the U.S., and California in particular, is really only 25 years old, so must the marriage of wood and wine be viewed.

In the big picture, the use of new barrels in winemaking is in its infancy stage. We have hundreds of years of winemaking time in front of us and with only a 25-year history behind us, there is so much still to learn.

French oak barrels have come of age in the last 25 years. Winemakers can choose from many different coopers, and each year more French coopers have representation in the U.S. There is a choice of forest, grain, barrel style, and toast level. Slowly, the same is becoming true for American oak.

American oak has undergone dramatic changes in the last 10 years, moving from having an image of whiskey barrels to having an image of genuine quality that can sometimes rival French oak in flavors at half the price. American oak *terroirs* are being explored, and some coopers are now offering forest selections.

In the non-barrel department, the last few years have seen many oak alternatives introduced. In addition to oak chips, barrel inserts, and tank inserts with different wood sources and toast levels, there are oak chunks, oak strips, oak sawdust, and oak extract.

Even the traditional barrel is changing as coopers integrate technology and research with market feedback. Competition and global expansion have forced coopers, traditionally family businesses, to re-examine how they manage their operations.

They are also re-evaluating how they cure and age their wood. Some cooperages that used to offer three-year air dried wood now only offer two-year air-dried wood. Some offer tight grain selections. Some offer custom toasting, others only a "house toast."

Along with these changes has come an evolution in the coopers' style. Just as winemaking styles change and evolve, so do coopers' styles. As a result, you may find that a particular cooper's barrel no longer gives you the same sensory characters it did a few years ago. This may be due to the evolution in the cooper's style, but also due to those changes in combination with changes in the vineyard.

Vineyard evolution

Nowhere is the adage "History repeats itself" more true than in California's vineyards, where phylloxera has had a lasting impact. A little more than 100 years ago, this pest caused devastating problems in California and France.

For the last 10 years, phylloxera has been having another run in California. Its impact cannot be overstated. The necessary replanting has resulted in more than $1 billion of vineyard investment in the last decade, and it has forced winegrowers to reassess what, how, and where to plant. At the same time, technology has made inroads in the vineyard in multiple ways from neutron probes to GIS (Geographical Information Systems) and GPS (Global Positioning Satellites).

In addition, the 1990s have seen a boom in the economy, and this has fueled growth and expansion beyond replanting requirements. Considerable outside money has poured into the wine business as people with fortunes from other industries invest in the good life.

American wines have taken their place alongside the best the world has to offer. While California Cabernet Sauvignon and Chardonnay have been world class for the last 20 years, only recently has Pinot Noir from Oregon and California started to challenge in the world court. New World Rhone and Italian varietals are in development also.

As winegrowers fine tune their planting strategies, they must also re-examine their winemaking strategies. New clones, different rootstocks, computerized weather stations, and new vineyard management strategies will all impact fruit composition and, therefore, wine quality.

Style factors

With many new vineyards just coming on line, it will be years before winemakers learn how best to express the fruit in their winemaking styles. They will be challenged to find harmony between their chosen winemaking style, what the vineyard is giving them, and what the consumer wants.

Ultimately you and your winery are judged by what's in the bottle. Your winemaking style is just that, your style, and as long as people like it and buy it, you stay in business.

Unfortunately, tastes and styles change. In the early 1980s, wine consumers loved big, rich, opulent, over-oaked Chardonnays. By the late 1980s and early 1990s, you couldn't give them away.

If you're making high quality wines in small amounts, you can pretty much make it in any style you choose. As long as it's good, there's always a market. But if your production is large, then the success model dictates that you learn what customers are looking for and find a way to get it to them.

This is a simple enough concept, and yet most winemakers take umbrage at the idea of someone other than themselves dictating their wine style. After all, winemakers are artists and scientists, not salespeople.

Nonetheless, change is inevitable, and the smart winemaker knows how to balance his or her own artistic desires with the reality of the marketplace. The problem is that the marketplace is a moving target. In addition, new vineyards, new clonal material, and new vineyard strategies all affect wine style.

The barrels that worked well with fruit from a 20-year-old vineyard may not do so well with fruit from the same replanted, four-year-old vineyard. Even if you can get marketing and production to agree on a wine style, achieving that style is another thing.

Experimental strategies

One of the best ways to determine what you want is to determine what you don't want. Put another way, you can't know what your limits are until you exceed them.

This is where experiments can play a vital role in determining winemaking style. Small trials can de done, and the results held in a library and tasted over time to determine what works and what doesn't.

Of course for large scale wineries this is a no brainer. They sometimes have entire staffs and buildings devoted to research. Gallo has a research facility that must even make the researchers at U.C. Davis envious at times. But what if your winery doesn't have those kinds of resources?

The good news is that even in a small operation, trials and experiments can play an important role in shaping wine quality and style. Barrel trials are tough because in order to obtain scientific, reproducible results you need large numbers of the same barrels to mitigate the effects of barrel variation.

Dr. Andrew Waterhouse from U.C. Davis states that even with 40 barrels per lot, there can be a statistical margin of error as great as 10%. Does this mean that two-, four-, or 10-barrel trials are meaningless? In a word, no!

While they won't produce a statistically confident result, one, two-, and four-barrel trials can yield useful information. They can give you an idea of what the wood does to your wine, and this may lead to larger scale trials in subsequent vintages.

If you're experimenting with chips, for example, a tank trial is preferable to carboy trials. But if you're limited in wine, or not willing to experiment on a whole tank, by all means do a trial in a five-gallon carboy or a 15-gallon beer keg.

The key is to experiment. Do as many cooper trials as you can reasonably handle each year. If you haven't done trials on toast levels or forest selections in a few years, it's probably time to revisit them.

If the last time you tried American oak was more than a few years ago, and you're still reeling from the whiskey lactone, dill, green characters you got, then it's time for another trial.

Between the coopers' evolution, the vineyard evolution, and the winemaking style factors discussed above, it's imperative that you develop some type of research and library program, however informal and simple it may be.

Planning ahead

Barrels are here to stay. Next to the grapes you use, barrels are the most important variable in determining wine quality. Proper planning is essential and, when done right, is an enormous chore.

The last few years have brought many changes to the wine business. This is also true of the cooperage business. These changes are not finished, as we are in the midst of a technological revolution and an industry evolution. And this is having and will continue to have profound effects on how wood and wine come together in harmony.

Before pencilling out this year's barrel order, there are a number of factors to take into consideration. Beyond the obvious issues of dollars and numbers lie more important issues — more important, at least, to wine quality and style. ■

Tim Olson is the managing partner and winemaker for Domaine Archer and is also a winemaking consultant. He can be reached at 707/566-8007.

Balance Key to Sauvignon Blanc's versatility with food

by Eleanor & Ray Heald

Sauvignon Blanc is one of the most versatile wines with food, yet only four percent of more than 300,000 vineyard acres in California produce Sauvignon Blanc. With an increasing U.S. interest in pairing wine with food, this neglect of Sauvignon Blanc is disappointing.

Despite this, no one is more enthusiastic about showcasing Sauvignon Blanc's versatility with food than chef Sunny Cristadoro at St. Supéry Winery (Rutherford, CA). Cristadoro began developing St. Supéry's Living Well Cuisine program in 1996, and she created a number of recipes to pair with the winery's varietal portfolio, including Sauvignon Blanc.

"Because it has been said that Sauvignon Blanc is the most versatile varietal with food, some (even professional chefs) have taken that to mean they can put anything with this wine," Cristadoro begins. "That's somewhat overstated."

Cristadoro agrees that Sauvignon Blanc's freshness makes it an ideal aperitif: a sipper, even without food. Because of this freshness, coupled with clean flavors, Sauvignon Blanc matches the spiciness of Thai foods, today's popular Asian cuisine, and harmonizes well with Mexican dishes.

"Even with the broad range of wine styles in bottlings of Sauvignon or Fumé Blanc, if the wine is balanced and so is the dish, the chances of the wine pairing with the food are quite good," she says.

"But today, some chefs are into shock value with high towers and architecturally-designed plates, independent of whether the ingredients match with wine, or even less with a particular wine. I'm focused on balance.

"Cajun and Creole cooking are popular, but sometimes have outrageous amounts of cayenne pepper. Authentic New Orleans cooking does not do that. Excessive amounts of cayenne put the dish out of balance, so it will not match any wine."

Simple complements

To achieve the best harmony of Sauvignon Blanc with food, Cristadoro suggests assessing the style which emanates from the wine's growing region. Warm climate Sauvignons yield grapefruit, lemon, and slightly grassy characters.

"This directly relates to citrus qualities perceptible in food matches," she maintains. "Grassiness suggests cilantro, chives, basil, and light, green herbs. There's a direct correlation and a simple complement."

Saucing is another of Cristadoro's focal points. Chicken can pair with any wine from Sauvignon Blanc to a big red, she notes. But you have to ask, "What are you putting on the chicken as a sauce?" It's not just the main element you're working with, but also the flavors you're putting alongside it.

Cristadoro likes to play on the fruit characters of Sauvignon Blanc. Sea bass with a salsa made from mango, kiwi, papaya, ginger, cilantro, and lemon juice is a winner. Sea bass can be poached in Sauvignon Blanc or seared if a crisp crunch is desired.

"The key is to let the buttery quality of the fish, particularly sea bass (or halibut), add its own richness to the dish," she says. "Tropical fruits bring out the same elements in the wine."

Simple contrasts

Looking at opposite flavors from the ones found in a wine is more challenging to accomplish than simple complements, but it yields wonderful rewards. Cristadoro points to spicy food qualities as opposites which match well with Sauvignon Blanc and keeps coming back to Thai foods as a great pairing.

"This works because of Sauvignon Blanc's refreshing acidity," she remarks. "The wine cleanses the palate. That's why people like beer with spicy food. It's cooling and cleansing on the palate. That's how Sauvignon Blanc reacts.

"But Sauvignon Blanc also does the same thing for creamy components such as an Alfredo sauce. A buttery Chardonnay would bore the palate in this case, because there are no textural differences. To my way of thinking, the same thing happens with Sauvignon Blancs that are barrel fermented in new oak and go through malolactic fermentation."

Some specifics

While balance remains Cristadoro's main clue to the best pairings, she points to the following generalities. (Her sure-fire matches for Sauvignon Blanc are in *italics*.)

Try Sauvignon Blanc with seafoods including: *oysters*, caviar, trout, smoked trout, *prawns*, salmon, smoked salmon, *filet of sole*, turbot, halibut, red snapper, frogs' legs, *sea bass*, *mussels*, *clams*, crab, *crawfish*, *shrimp*, escargot, *sushi*, *sashimi*, and *scallops*.

Meat preferences are chicken, veal, sweetbreads, quail, turkey, pork, and prosciutto.

Those preferring meatless preparations can rejoice in the myriad of wine-friendly vegetables, such as asparagus, *cucumber*, spinach, green olives, bell peppers, endive, baby vegetables, celery, carrots, corn, zucchini, potatoes, *hot peppers* (anaheim, jalapeño, poblano, serrano), *green onions*, onions, peanuts, parsnips, beets, mushrooms, and *veggie burgers*.

Herbs to look for or include in a recipe are: mint, *dill*, basil, summer savory, saffron, fennel, thyme, tarragon, *cilantro*, cumin, capers, chives, parsley, *lemon grass*, bay leaf, sage, *coriander*, and watercress.

Fruit matches are: *lemon*, fresh tomato, *kiwi*, strawberries, grapes, *papaya*, *mango*, and avocado.

Making the best cheese matches are: *fresh goat cheese*, parmesan, *feta*, pepper jack, brie, blue, gruyère, and Swiss.

Grains pairing well are pasta, rice polenta, and couscous.

Condiment suggestions are: olive oil, *wasabi*, *horseradish*, apple sauce, pickled

ginger, soy sauce, and garlic.

Recipe magic

Paht Thai, or Pad Thai as many people know it, is a truly basic Thai dish. It combines a variety of ingredients creating a great balance of sweet and sour, mild and spicy, soft and crunchy.

The ingredients themselves are easily obtainable and are ones Cristadoro works with regularly. She considers this variation simple, basic and fabulous with fresh, clean, non-malolactic fermentation or lightly oak-imprinted Sauvignon Blancs.

She suggests that if you try the recipe, you "play around" with the measurements of the various flavorings until a taste is achieved that you can call your own.

PAHT THAI

(serves six)

Ingredients:

½ pound thin rice noodles
1 tablespoon peanut oil
2 tablespoons chopped garlic
1 pound raw shrimp, peeled and deveined
2 eggs, beaten lightly
3 tablespoons fish sauce (available at Oriental markets)
1 medium lime, juiced
2 teaspoons of black bean sauce with chili
2 tablespoons brown sugar
3 tablespoons chopped, dry-roasted peanuts
2 cups bean sprouts, washed and drained
2 cups sliced scallions

In a medium bowl, soak noodles in warm water for 15 minutes. When noodles are limp, drain and set aside.

Heat a wok over medium-high heat. Add ½ tablespoon of oil and rotate wok to spread oil evenly. Add garlic and toss until golden. Add shrimp and cook until they just turn opaque, about one minute. Remove from wok.

Add eggs to wok and rotate to spread evenly and thinly. When eggs start to set, use a spatula to peel them from sides and scramble. Remove and set aside with shrimp. Add remaining oil and heat. Add noodles.

With spatula or tongs, spread noodles out on sides of wok. Then scrape back to center of wok. Continue stretching noodles and turning them until they become soft, white curls. In a separate bowl, combine fish sauce, lime juice, black bean sauce, and sugar. Add to wok and toss noodles to coat.

Add peanuts, sprouts, scallions, shrimp, and eggs. Toss all ingredients and heat through. Transfer to plates or platter and serve.

CHILEAN SEA BASS TORTILLAS WITH GINGER-PEAR SALSA

(serves 6)

Ingredients:

6 6-inch flour tortillas
1 tablespoon fresh lime juice
1 teaspoon grated lemon peel
1 tablespoon Sauvignon Blanc
2 teaspoons minced fresh ginger root
1 ripe, medium pear
1 ripe, large peach
1 ripe mango
2 ripe kiwis
½ cup diced pineapple
½ cup finely-diced red onion
1 tablespoon finely chopped cilantro
1 cup Sauvignon Blanc
12 ounces Chilean sea bass, or similar white fish

¼ teaspoon salt
⅛ teaspoon freshly-ground black pepper
3 cups mixed greens

Slice each tortilla into six equal triangles. Lay on cookie sheet; bake at 350°F until crispy, about five minutes.

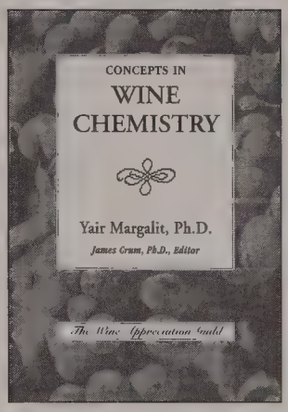
In a small bowl, combine lime juice, lemon peel, wine, and ginger. Peel and seed pears, peach, and mango and dice very small; add to juice mixture. Add diced pineapple, onion, and chopped cilantro to mixture. Toss together and set aside.

Pour wine into a medium pan and heat to simmer. Place bass filets in pan. Poach fish in wine until it is opaque and cooked through. Cooking time will vary with thickness of fish, but should only take a few minutes. Sprinkle with salt and pepper. Cut or crumble fish into small pieces.

Drain salsa, reserving liquid, set aside. In medium bowl, toss together lettuce and salsa liquid. Place ⅙ of greens in center of each plate. On each tortilla triangle, place a small amount of bass; top with a teaspoon or two of salsa.

Arrange tortillas around greens and serve. ■

THE SCIENCE BEHIND THE ART OF WINEMAKING



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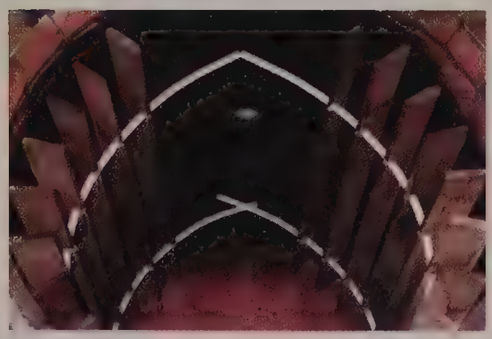

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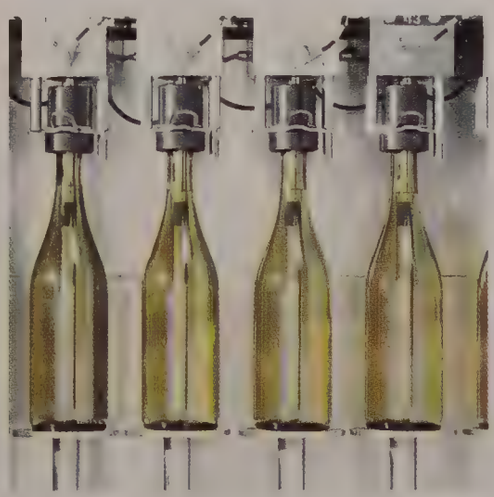

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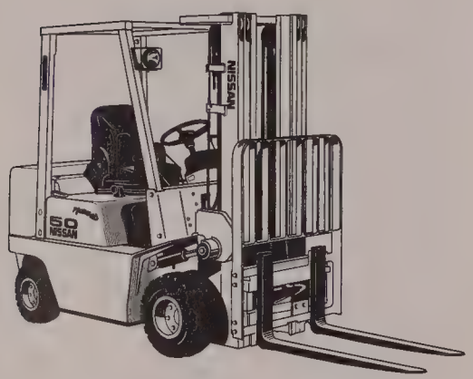

Accurate Forklift provides sales and rental of a large variety of forklift attachments for bin dumping and palletless handling of case goods.

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McClain & Mahaffey Associates pioneered the use of ozone in the wine industry and offers a complete line of ozone sanitation equipment. McClain & Mahaffey has worked closely with winemakers to develop and implement standard operating procedures for the use of ozone equipment in the winery environment. The client list includes more than 50 wineries of all sizes, and customer support and service are provided.

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McClain & Mahaffey Associates
2772 Elks Way, Napa, CA 94558
tel: 707/254-0576; fax: 707/254-0576

HANSEL LEASING, INC.

Hansel Leasing, Inc., is a full service automobile, truck, and equipment leasing company that has served Sonoma and Napa counties for over 30 years. Hansel specializes in leasing winery equipment, including wine barrels, labeling machines, bottling machines, wind machines, stainless tanks, barrel racks, and many other types of equipment that are important to producing good wine. The company also leases trucks, tractors, and cars.

Many types of lease programs are available, ranging from 24 months to 60 months. Hansel has fair market value leases as well as guaranteed value leases. You can put money down or apply minimal "get in" fees. Hansel provides very flexible credit terms and is quite willing to work out deals for special situations. The staff is quite well-versed in the winery and vineyard business. Hansel's current client list includes Geyser Peak Winery, Codera Wine Group, Hansel Vineyards, Testarossa Winery, Vinifera, Inc., Castle Vineyards, Villa Adriana, and Knollwood Vineyards.

For more information or a lease quote on any of your current or future needs, contact:

Hansel Leasing, Inc.
2800 Corby Ave., Santa Rosa CA 95407
tel: 707/525-1545; fax: 707/544-7801

EURO-MACHINES, INC.

The Euro-Machine product line includes Europress by Scharfenberger Company; Kiesel, Mohno, and Rauch juice and must pumps; and Rauch and Wottle destemmer/crushers.

The all stainless steel Europress is available in capacities to suit every size winery, ranging from 380L to 32,000L. It offers a built-in drive motor, compressor and vacuum pump, axial in-feed valve, and two large sliding doors (optional pneumatic) that allow easy filling, emptying, and cleaning.

The Europress offers a freely programmable, fully automatic digital control, LCD panel and champagne program. The dependable, low-maintenance Europress has many advantages: 1) largest door opening available, 2) unrestricted full capacity drum (ideal for whole cluster pressing), 3) draining area

encompassing 50% of the drum circumference, 4) 4-inch, 5-inch, or 6-inch axial inlet with ball valve, 5) extremely slow rotational speed of 1.5 RPM with axial feed and pulse timer (which is ideal for crushed grape pressing with the highest possible pre-juicing and greatest through-put.

Also available are Kiesel and Guth tank mixers, SO_2 dosers, steam generators, used and reconditioned membrane, bladder, and spindle presses.

For more information, contact:

Euro-Machines, Inc., East
PO Box 843, Culpeper, VA 22071
tel: 540/825-5700; fax: 540/825-5789

Euro-Machines, Inc., West
5199 Fulton Drive, Suite I, Fairfield, CA 94585
tel: 707/864-5800; fax: 707/864-5879

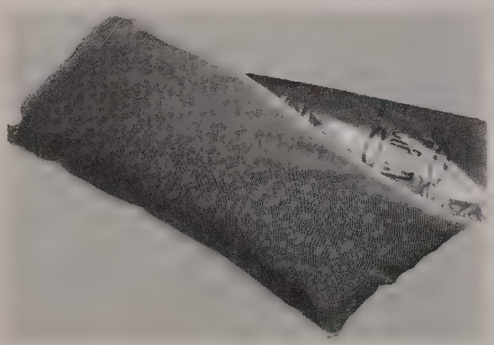
PLEASE SEE THE EURO-MACHINES ADS, PAGES 6, 58.

STAVIN INCORPORATED

StaVin Incorporated designs oak infusion systems offering versatility and cost-effective alternatives to oak barrels. Available in all toast levels, StaVin offers premium quality French and Hungarian 24-month air-dried oak and 36-month air-dried American oak.

Paying strict attention to thermal parameters to ensure thorough heat penetration, StaVin oak is traditionally fire-toasted offering elegant flavor profiles.

StaVin's Modular Tank Units, with full staves, achieve the maximum benefit within stainless or oak tanks. StaVin's new French oak stave segments, conveniently packaged in food-grade, FDA-approved, nylon 15-pound bags, and American and Hungarian Oak Bean in 10- or 20-pound bags are placed directly in the tank.



StaVin offers three methods to impart neutral barrels with equivalent flavors of new French, Hungarian and American oak barrels. Traditional barrel inserts are loaded with full staves. Two unique alternatives to pulling heads from barrels are StaVin's patented Oaksleeve, which is comprised of mini-staves packaged in FDA-approved nylon, and StaVin's stainless steel Infusion Tube, loaded with oak cubes; both are inserted through the bunghole.

StaVin represents three-year air-dried Sansaud barrels, two-year air-dried Tonnellerie Berthomieu and Tonnellerie Bernard French oak barrels, and two-year air-dried Kelvin Cooperage American oak barrels.

For more information, contact:

StaVin Incorporated
PO Box 1693, Sausalito, CA 94966
tel: 415/331-7849; fax: 415/331-0516
e-mail: info@stavin.com

PLEASE SEE THE STAVIN AD, PAGE 71.

TCW – THE COMPLEAT WINEMAKER

TCW manufactures, adapts, and distributes processing equipment to the wine and beer industries, including:

- Bottle neck finishing equipment,
- Corking (with vacuum) and cork pulling equipment, manual and semiautomatic,
- Crushing and destemming equipment,
- Filtration equipment and supplies,
- Fittings and valves, many sizes and types,
- Hose, tubing, and banding,
- Instruments and measuring equipment,
- Labeling equipment and supplies,
- Wine presses,
- Processing tools and supplies, stock and made-to-order,
- Pumping equipment, including the most gentle peristaltic design,
- Rinsing and filling equipment.

Call TCW today to discuss your needs.

For more information, contact:

The Compleat Winemaker
955 Vintage Ave., St. Helena, CA 94574
tel: 707/963-9681; fax: 707/963-7739

PLEASE SEE THE COMPLEAT WINEMAKER AD, PAGE 111.

SCOTT LABORATORIES, INC.

Scott Laboratories offers machinery from Velo (filters, presses, rotary fermentors), Willmes (presses), Manzini (pumps), Armbruster (stemmer/crushers, must pumps), and Guth (mixers, stands).

New to Scott is the MBF bottling equipment. Items include: rinsers, blowers, fillers, corkers, cappers, and conveyers together with line design and automation. Equipment can be supplied as stand alone or as monoblocs. Speeds range from 40 to 325 BPM.

MBF principals and the engineers have literally hundreds of years of experience in the design and manufacture of bottling equipment.

When designing the MBF line of fillers, particular emphasis was given to:

- Minimal oxygen pick-up. A new valve guarantees oxygen pick-up of less than 0.22 pm for standard 750 ml bottles.
- Simple, efficient sanitation. MBF offers a completely automatic CIP system with no dummy bottles.
- Fill-level precision and quick changeover. No specialized tools. Filling heights can be adjusted automatically.

MBF corkers offer an option for a rapid sequence of vacuum, inert gas injection, and second vacuum prior to cork insertion; standard 55 mm cork jaws; and optional electronic cork depth plunger regulation.

Innovative MBF fillers and corkers hold a total of six patents.

Scott Laboratories supports all sales with a large in-house parts department and trained in-house service mechanics.

For more information, contact:
Scott Laboratories, Inc.
2220 Pine View Way, Petaluma, CA 94955-4559
tel: 707/765-6666; fax: 707/765-6674
e-mail: info@scottlab.com;
website: www.scottlab.com

PLEASE SEE THE SCOTT LABORATORIES AD, PAGE 12.

WORLD COOPERAGE

Your one source for quality and value, World Cooperage believes in giving winemakers options. The cooperage now offers French, American, or chestnut oak barrels (each providing different oak flavors) that are water bent, fire bent, dry heat oven bent or steam bent.

World Cooperage's hybrid barrel, composed of French oak heads and American oak staves, has seen a rise in popularity. Barrels with extra-fine grain oak harvested and milled at the company's stave operations are also available. The cooperage continues to offer three super-premium barrels: the French-coopered Barrique Bardot barrel and handcrafted TW Boswell Legacy barrels in either American or chestnut oak.

As an economical alternative to barrels, air-seasoned toasted oak chips, tank stave systems, and barrel renewal systems are available in several configurations.

Established in 1912 by T.W. Boswell, today World Cooperage is owned and operated by fourth generation management. World Cooperage has relocated its international sales headquarters to Napa Valley's Corporate Park.

For more information, contact:
World Cooperage
2557 Napa Valley Corporate Dr., Ste. D
Napa, CA 94558
tel: 888/33-COOPER or 707/255-5900;
fax: 707/255-5952
e-mail: info@cooperage.com

PLEASE SEE THE WORLD COOPERAGE ADS, PAGE 28 & 74.

LOGIX® WINERY CONTROLS

Drawing from more than 10 years of control system design and installation in the U.S. and around the world, Logix has brought a new level of control to winemaking.

Using cutting-edge controls and computer technologies, Logix offers custom winery control systems. With a Logix system, winemaking takes a giant leap forward — to a point where fermentation temperatures are precisely controlled and a variety of winery processes are integrated. The big payoffs: more time and resources to focus on winemaking, plus a winery that operates more efficiently.

With a Logix system, winemakers can plan and implement the ideal fermentation process, generate a wealth of information about their winemaking, and improve overall facility operations. Besides making fermentation easier and more precise, Logix systems can ensure energy-efficient refrigeration equipment operation, maintain accurate barrel room control, and implement reliable wastewater monitoring. The system features 24-hour remote alarm notification and access capabilities that will give you a new peace of mind.

With a Logix system, you gain access to an experienced team of controls professionals who will partner with you to meet your goals and offer service and support to keep your system working today and everyday.

There is an easier, better way to control your winery.

For more information, contact:
Logix
10518 N.E. 68th Street, Kirkland, WA 98033
tel: 425/828-4149; fax: 425/828-9682

PLEASE SEE THE LOGIX WINERY CONTROLS AD, PAGE 88.

OGLETREE'S

For over 50 years, Ogletree's has specialized in the customized fabrication of winemaking equipment for California's premier wineries and vineyards. These vintners rely on Ogletree's to care for the nuance and detail of their receiving hoppers, belt and screw conveyors, transfer lines, catwalk systems, and other structural components. Ogletree's eye for detail focuses on the refinements of clean, finished work, polished welds, and well-fitting assemblies.

Because of Ogletree's more than 100 years of collective experience in the wine industry, winemakers and winery owners get more than just an aluminum catwalk system or stainless steel processing equipment when they contract with Ogletree's to work with them; they get a storehouse of knowledge that no one person alone could offer. Ogletree's working knowledge of the industry enables company designers to see potential problems or flaws in design or planning of expansions and upgrades. This familiarity also allows Ogletree's to offer solutions and new designs to achieve the original, intended goal.

Ogletree's has proven to be a valuable partner to all its clients. Serving the industry from its facility in St. Helena since 1946, Ogletree's helps wineries, large and small, distinguish their products in a competitive marketplace.

For more information, contact:
Ogletree's
935 Vintage Ave., St. Helena, CA 94574
tel: 707/963-3537; fax: 707/963-8217
PLEASE SEE THE OGLETREE'S AD, PAGE 45.

CELLULO COMPANY

Cellulo Company has been working with the wine industry for generations. Cellulo offers a diverse line of filtration media (Cellu-Flo® cellulose filter aids, Cellupore® filter sheets and Cellu-Stack® filter cartridges) and processing equipment.

Cellulo is one of the largest manufacturers of depth filter media in the U.S. Cellu-Stack® filter housings and filter cartridges are ideal for filtering all varieties of high-quality wine, and they reduce product loss due to leakage and hold-up. Cellu-Stack® filter housings are manufactured of 316L stainless steel and hold from one to four Cellu-Stack® cartridges (18 sq.ft. to 72 sq.ft. effective filter surface area).

The full-line of Mettler-Toledo portable and in-line dissolved oxygen analyzers, pH and conductivity measuring systems, and McNab in-line colorimeters and turbidimeters are available from Cellulo.

For your tank cleaning needs, Butterworth's all stainless steel Model LT-10 light weight (15 pounds) tank washing machine is efficient and effective. Cellulo also offers Perlick sample valves and supplies.

Cellulo strives to provide products of the highest quality with superior technical support and customer service, and to fully satisfy the needs of customers.

For more information, contact:
Cellulo Company
Fred Mazanec, Phil Crantz,
Rodger Pachelbel, or **Ken Stewart**
81 M Street, Fresno, CA 93721
tel: 209/485-2692; fax: 209/485-4254
e-mail: mail@cellulo.com
web page: www.cellulo.com
PLEASE SEE THE CELLULO AD, PAGE 56.

CANTON COOPERAGE CO.

In 1998, owner of the French wine barrel cooperage, Taransaud, announced the purchase of Canton Cooperage and its associated stave mills. Chene et Cie company president, Mr. Henri de Pracomtal, confirmed that the existing management and sales personnel would remain, and he has implemented a several year program to expand production at Canton Cooperage.

Taransaud has a worldwide reputation for quality cooperage. The company's association with the Canton brand will augment Canton's push toward higher levels of quality and consistency in the American and Hungarian oak barrels. Beginning with picking the best of the white oak at the stave mills, this quality push will continue with the extended air drying of the oak and on to the toasting, fabricating, and finishing of the barrels.

For more information or to order Canton Cooperage barrels, contact:
Canton Cooperage Co.
365 S. Woodlawn, Lebanon, KY 40033
tel: 800/692-9888; fax: 502/692-3998
e-mail: barrels@canton.win.net
PLEASE SEE THE CANTON COOPERAGE AD, PAGE 68.

FOOD, WINE, & SPIRIT, INC.

In winemaking, there is no doubt Americans have learned a lot from the French. However, U.S. pioneer spirit and technology have elevated wine quality and challenged age-old French winemaking techniques. In reaction to this, the French have explored new directions toward the improvement of wine quality, and in this search **every** detail is important.

In recent years, the French have reconsidered the benefits of some wine agents that have been used in winemaking for decades. Among these agents are tannins known as "tannins oenologiques." Suppose tannins from the best air-dried French oak wood could be carefully removed and subsequently preserved for use in winemaking. These tannins could then be precisely measured and added to grape juice or wine. This product already exists under the name — Oenotan Selection Freeze Dried Oak Tannins.

Oenotan Selection is produced from

high quality, three-year-old, air-dried oak of the Limousin, Allier, and Nevers forests. Phenolic compounds (mostly tannins) are carefully removed by the use of water, **not** ether or alcohol. The use of water to remove these tannins develops hydrolysis of the glucosides (association of tannins and sugars) which reduces bitter and astringent characteristics often associated with wood tannins.

The resulting water solution is slowly concentrated. This concentration step is analogous to the barrel toasting process as it also generates furanic compounds. The resulting solution is then freeze dried. Oenotan Selection can yield results substantially identical to the phenolic compounds found in wine that has aged in an ideal French oak barrel and costs only pennies per case.

For more information, contact:
Food, Wine, & Spirit Group, Inc.
PO Box 10234, Napa, CA 94581
tel: 707/255-2031; fax: 707/253-8234

PLEASE SEE THE FOOD, WINE & SPIRIT GROUP AD, PAGE 40.

BARREL ASSOCIATES INTERNATIONAL

Barrel Associates International offers some of the finest barrels possible for your wine. Each barrel serves as a flavor platform to showcase your fruit. Lovely textures and elegant flavors marry with your best vineyard efforts to produce wine you can be proud of.

Tonnellerie Dargaud et Jaegle — For the absolute finest in craftsmanship and taste, Tonnellerie Dargaud et Jaegle Burgundy and Bordeaux barrels add lovely texture and flavors to your wine. A third generation cooper, Jean Marcel Jaegle immerses the finest air-dried French oak into hot water before bending and firing these elegant barrels. This process allows for a deep penetrating toast whose consistency provides predictable and spicy components to your wine year after year. Nevers, Tronçais, Allier, Vosges, Jura, Darney, and Les Bertranges are some of the very tight-grained woods that are available from Tonnellerie Dargaud et Jaegle.

Maison Louis Latour — The barrels that have made Corton-Charlemagne the legendary wine it has become are available in limited quantities through Barrel Associates International. Each barrel is handcrafted in traditional Burgundian style and made from a combination of Allier and Vosges woods.

Classic American Oak — Sophisticated flavors of Barrel Associates American oak add texture, complexity, and finesse to fine wines. Completely air-dried wood is coopered in fire-bent tradition or skillfully treated to Barrel Associates' water-bent and DeepToast™ formats. Extended firing and toasting time reveals pleasing undertones and reduced oak tannins. Choose flavors and toasting requirements for perfect integration and superb results.

For more information, contact:
Barrel Associates International
575 Lincoln Ave. #200, Napa, CA 94558
tel: 707/257-0714 (CA, OR, WA), 800/227-5625
fax: 707/257-0742

PLEASE SEE THE BARREL ASSOCIATES ADS, PAGE 16 & 32.

CARLSEN & ASSOCIATES

Carlsen & Associates designs and manufactures processing equipment for the wine industry with a primary product line of pumps and pump systems.

The most versatile of these products is a portable positive displacement pump, utilizing a Waukesha pump head coupled to a gear motor and controlled by a variable-speed, AC-frequency controller. Carlsen has developed a system that will pump must (through 80 tons per hour), do racking, transfers, barrel transfer, pump overs, filtration, and pump the wine to the filler for bottling. This is truly the one pump that will do everything in a winery. Gone are the days when a winery had to purchase specific pumps for each process.

Another important pumping development is the double diaphragm air pump. As the industry moves into more barrel fermentation and ageing, the need for simple, gentle pumps to fill and empty barrels has become extremely important. The double diaphragm air pump, complete with a surge suppressor, is the ideal pump for this work. It is capable of pumping to pressures in excess of 100 PSI. Hence, it is also well-suited for filtering and, with the installation of a doubling kit, will produce twice the amount of product pressure to air inlet pressure. With the doubling kit option, it is used for lees filtering.

Carlsen & Associates also offers a complete line of centrifugal and flexible impeller pumps and is constantly reviewing existing products for improvements and developing new lines to help improve winemaking techniques.

For more information, contact:
Carlsen & Associates
1439 Grove St., Healdsburg, CA 95448
tel: 707/431-2000; fax: 707/431-2005

PLEASE SEE THE CARLSEN & ASSOCIATES AD, PAGE 33.

COREY DELTA CONSTRUCTORS

Corey Delta (CD) Constructors was founded in 1974 and continues to operate as a general engineering contractor serving the wine industry and other industrial markets in the western U.S. The company's growth and success are a direct result of a corporate commitment to safety, innovation, and integrity. Primary areas of expertise include civil, structural, and mechanical installations.

In 1996, Corey Delta received the top national award for safety in the industrial division of the Associated General Contractors of America (AGC), and in 1997 the company received the 1997 top award for safety from the AGC of California.

CD craftspeople are trained in the use of the most up-to-date, innovative construction technology including automated track welders for installation of channel refrigeration jackets on wine tanks, orbital welding for process lines (including juice), and laser pump alignment. CD is experienced in the installation of all types of winery equipment.

Corey Delta's experience in the wide variety of winery construction and maintenance projects, combined with a nationally recognized safety program, assures winery customers of a successful project.

For more information, contact:
Corey Delta, Inc.
PO Box 637, Benicia, CA 94510
tel: 707/747-7500, fax: 707/745-5619

JUVENAL DIRECT, INC.

Juvenal Direct, Inc., supplies a complete line of natural cork closures from Juvenal Ferreira da Silva of Portugal and cork coating systems developed by Rudolf Ohlinger GmbH of Germany. In addition, Juvenal Direct now represents the following companies:

Filtrox AG of Switzerland-celebrated its 60th anniversary in October 1998 and has established an excellent quality and performance record for its filter sheets and cartridge filters. Juvenal and Filtrox are now introducing the Filtrox high-performance FILTROjet® D.E. Candle and FILTROmat® pressure-leaf filters, available in 100 to 1,200 sq.ft. of filter area, from manual to fully automated PLC-controlled operation.

Juvenal Direct offers the full line of EPC low-pressure pneumatic membrane presses (1,000 to 15,000 liters) from A. Sutter AG of St. Gallen, Switzerland. EPC presses have a stainless steel tank and frame with one or two sliding doors, large axial feed inlets with knife valves, and over-pressure control. Presses up to 5,000L capacity are fully self-contained with integrated compressors. All models are equipped with the EPC-Logic PLC control panels. The optional EPC Logic "Comfort" control panel includes a large screen with graphics display. Both control systems allow for fully automatic self-optimization of individual programs, including special programs for whole cluster pressing.

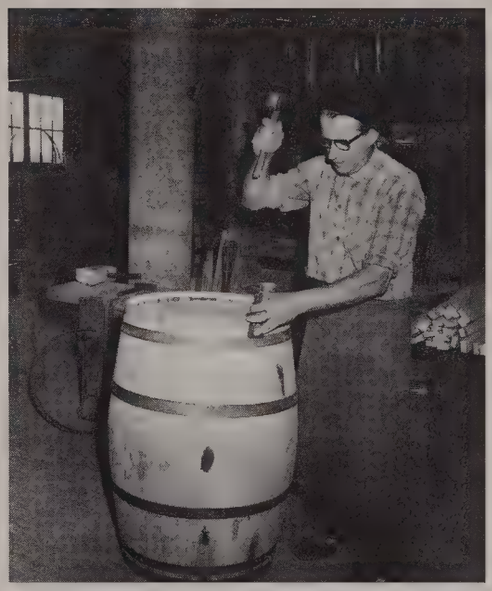
Juvenal Direct is the West Coast distributor to the wine industry for Rohm Enzyme GmbH (c/o CREANOVA, Inc.) and carries the complete line of ROHAPECT® enzymes for production of grape juice and wine.

For more information, contact:
Juvenal Direct, Inc.
PO Box 4559, Napa, CA 94581-5449
tel: 707/254-2000; fax: 707/642-2288

PLEASE SEE THE JUVENAL DIRECT ADS, PAGES 22, 42, 70, AND 80.

IBC NETWORK

IBC Network imports and distributes French oak barrels from Burgundy (Tonnellerie Rousseau) and Bordeaux (Tonnellerie Saint-Martin). Jérôme Aubin is the sales contact.



Tonnellerie Saint-Martin is a family business in Bordeaux with over 50 years' experience through three generations of coopers. High quality standards include oak from Center of France and Vosges; long, natural, open-air drying of the woods; and heating over an open wood fire. ***Tonnellerie Saint-Martin*** provides 225 L Bordeaux Transport (22 or 27mm staves), Bordeaux Ferré (22mm, steel hoops), and Bordeaux Tradition (22mm, chestnut hoops), as well as American oak barrels from white oak staves crafted and seasoned in the Bordeaux region for at least 18 months.

At ***Tonnellerie Rousseau,*** deep in the heart of Burgundy, two generations of coopers have crafted French oak barrels for 40 years. Yearly production does not exceed 4,000 Burgundy-style barrels, sold mostly to the nearby vineyards of Vosne-Romanee and Nuits St. Georges, as well as to South Africa, Australia, and California. The toasting process is carefully monitored and adapted to Pinot Noir or Chardonnay barrel ageing. Besides coopering 228 L Burgundy Transport (27mm) and Tradition (27mm, chestnut hoops) from the best forests of Allier, Burgundy, Vosges, and Center of France, ***Tonnellerie Rousseau*** also produces custom-made casks, ovals, and upright tanks.

For more information, contact:
IBC Network
Jérôme Aubin
3517 Alta Vista Ave., Santa Rosa, CA 95409
tel: 707/527-8923; fax: 707/568-5640
cell: 707/696-9501
e-mail: ibc-network@metro.net

PLEASE SEE THE IBC NETWORK AD, PAGE 86.

IRAPP, INC.

Since 1972, IRAPP, Inc., along with Alary Corporation, has provided the wine industry with the design, construction, installation, and service of its winery refrigeration requirements. Equipment is provided that will satisfy current needs and grow to meet future needs. Water, glycol, or ammonia-based cooling can be supplied. Bill Davidson, licensed chief engineer, has been providing engineering services to the wine industry since 1968. His expertise, along with his capable engineering staff and the support force of qualified mechanics, has allowed IRAPP to provide top quality refrigeration to the industry today. Twenty-six years of experience make IRAPP uniquely qualified to provide all of a winery's refrigeration and process piping needs.

For more information, contact:
IRAPP, Inc.
PO Box 129, Healdsburg, CA 95448
tel: 707/433-9471; fax: 707/433-1310

PLEASE SEE THE ALARY CORP. AD, PAGE 82.

PICKERING WINERY SUPPLY

Pickering Winery Supply (PWS) offers stainless steel tanks and oak barrels from several manufacturers.

Modern Brewing & Design (MBDI) is a three-year old company in Santa Rosa, CA, which fabricates stainless steel tanks. Together, the four owner-operators have 40 years experience and can build truly custom tanks, ranging from the smallest porta-tanks up to 200,000 gallons. MBDI offers the newest technology, craftsmanship, aesthetics, reliability, value, and professionalism. Call for a price quotation and references.

Tonnellerie Meyrieux is a small Burgundian cooperage that specializes in extremely long toasts: its medium,

"pain grille" barrels must endure the braziers for 1½ hours. Each barrel is handmade by the cooper, Antony Meyrieux. Combining traditional craftsmanship with unique innovations, nothing is overlooked to make some of the finest barrels in Burgundy. Quantities are extremely limited.

Tonnellerie Vernou firmly believes that the best barrels are the result of careful control over the entire production process. From buying the logs to splitting the staves and building the barrels, producing a good, consistent product from year to year has been Vernou's goal. Besides the usual forest choices, Vernou also offers the option to specify super-fine, fine, or medium grain; regular or extra-smoky toast; and "waterbending" the barrels to remove the bitterest tannins.

Tonnellerie de La Grande Champagne unites a master cooper with a forestry expert who was formerly in charge of selecting and acquiring the logs for one of the most prestigious coopers in France, this relatively new cooperage already has an impressive list of Bordeaux references.

For more information, contact:
Pickering Winery Supply
888 Post St., San Francisco, CA 94109
tel: 415/474-1588; fax: 415/474-1617

PLEASE SEE THE PICKERING WINERY SUPPLY AD, PAGE 116.

TONNELLERIE FRANCAISE

Since 1980, Tonnellerie Francaise has pioneered American oak wine barrels coopered in the traditional French method but tailored to American oak's distinctive character.

Tonnellerie Francaise also offers French oak from Tonnellerie Nadalie in Bordeaux and Tonnellerie Marsannay in Burgundy. Barrels are crafted to your specifications in 225L through 500L capacities and the oak and toast of your choice.

TONNELLERIE FRANÇAISE
NADALIE

To better understand regional variations of American oak flavor, Tonnellerie Francaise initiated the American Oak *Terroir* Trial in 1996. In the first year of the experiment, participating wineries in California and Oregon made wine using barrels coopered from oak forests in Missouri, Virginia, Pennsylvania, Oregon, and the Center of France. A series of comparative wine tastings followed, attended by nearly 300 winemakers.

This trial continued in 1997 and 1998 using barrels coopered from oak forests in Missouri, Virginia, Pennsylvania, and Minnesota, as well as a blend. Another series of experimental wine tastings is scheduled for early 1999. Please contact Tonnellerie Francaise for more information or a reservation.

The growth of the wine industry has created a strong demand for barrels. To ensure availability, Tonnellerie Francaise recommends that crush orders be placed as early in the year as possible.

For more information, contact:
Tonnellerie Francaise
Duane Wall, Alain Poisson, or **J.C. Deguy**
PO Box 798, 1401 Tubbs Ln.,
Calistoga, CA 94515
tel: 707/942-9301; fax: 707/942-5037

PLEASE SEE THE TONNELLERIE FRANCAISE AD, PAGE 5.

CUESTA EQUIPMENT COMPANY

Cuesta Equipment was established in 1974 and became a California Corporation in 1980. The company has three business locations, serving the entire Central Coast of California. The San Luis Obispo store consists of 24,000 sq.ft.; the Santa Maria store is 10,000 sq.ft.; and the newest store in Paso Robles also has 10,000 sq.ft. of retail and warehouse space.

Cuesta takes pride in the depth, quantity, and quality of products and merchandise stocked in its three locations to serve customers. The business was founded on the premise of supplying customers with the complete package of tools, hardware, and materials required to perform their jobs in the best and most cost effective manner.

Time is money, and Cuesta provides customers with all their job requirements all in *one stop.* The customized catalog and the fabrication shop are just two key aspects that set Cuesta Equipment apart. Cuesta is very proud of its business but the staff realizes their success is derived from you, their valued customer. Cuesta staff would like to take this opportunity to convey their thanks and gratitude.

For more information, contact:
Cuesta Equipment Company
4540 Broad Street, San Luis Obispo, CA 93401
tel: 805/544-2540; fax: 805/544-2627

PLEASE SEE THE CUESTA EQUIPMENT ADS, PAGE 11 & 43.

TONNELLERIE SAURY

Tonnellerie Saury is a third-generation cooperage situated at the base of the Massif Central mountain range in France. Saury is conveniently located near the central forests of France, allowing the cooperage to select only tight grain wood. Therefore Tonnellerie Saury provides the finest quality wood to its clients.

Tonnellerie Saury focuses on the needs of the winemaker and adapts the barrels accordingly. As a consequence, the cooperage has developed an immersion bending process in addition to its traditional wood fire bending. Saury continues to explore new methods of production, with a respect for the traditions of the past.

Please contact Tonnellerie Saury for further information and join in the marriage of fine wine and exceptional barrels.

For more information, contact:
Tonnellerie Saury or
Tonnelleries de Correze, USA
Bayard Fox
PO Box 672, Rutherford, CA 94574
tel: 707/963-3666; fax: 707/963-8228

PLEASE SEE THE TONNELLERIE SAURY AD, PAGE 26.

PROSPERO EQUIPMENT CORPORATION

Prospero Equipment Corporation and AWS of California bring to the wine industry the widest line available of packaging and process equipment. This includes Prospero's GAI monoblocks with Kosme precision rotary pressure-sensitive labeling machines. At WineTech 99, Prospero will exhibit its complete line of Della Toffola presses, filters, thermo-vinification, and instant cold stabilization equipment. Please visit the company's booths at both WineTech or the Unified Symposium in January.

For more information on Prospero's complete line of winery equipment, crushers, membrane presses, rotary fermentors, pumps, filters, and all types of packaging equipment, visit the website at www.wineryequipment.com.

For more information, contact:
Prospero Equipment Corporation
PEC Main Office
tel: 888/732-1222; fax: 914/769-6786
e-mail: prospero@cloud9.net
AWS California
tel: 800/953-3736; fax: 707/838-3164
e-mail: aws@sonic.net
PEC Midwest
tel: 319/263-1394; fax: 319/263-1698
e-mail: davemetz@muscanet.com

PLEASE SEE THE PROSPERO AD, PAGE 46.

MOBILE WINE LINE

Mobile Wine Line, the pioneer in the field of mobile bottling, has improved over the 21 years it has been in operation.

Its 42-foot custom tractor-trailer unit contains an Otto Sick 16-valve, four-head filler/corker, a McBrady Engineering Orbit bottle sparger, an OMB capsule applicator, a Bertolaso five-head capsule spinner, a New Jersey Machine Mustang II glue labeler, a Label-Aire pressure sensitive labeler, two label presses, a 3M tape sealer/ printer, and a Waukesha positive displacement wine pump.

The winery need only provide 220 single- or three-phase power, 10gpm potable water, glass, corks, capsules, labels, bottle-ready wine, and a few friends.

Call and take advantage of Mobile Wine Line's mechanical know-how, dedication to quality, willingness to tackle the unusual, and cost-effective pricing.

"Don't trust the quality of your product to anything less than the quality of ours."

For more information, contact:
Mobile Wine Line
9601 Robson Road, Galt, CA 95632
tel: 209/745-2871; fax: 209/744-0443
e-mail: winebird@inreach.com

PLEASE SEE THE MOBILE WINE LINE AD, PAGE 35.

MEL KNOX BARREL AND BOTTLE BROKER

If you don't know about the two cooperages represented by Mel Knox, then you are an enological Rip Van Winkle, or perhaps you've just spent too much time surfing the Net.

Mel Knox represents two of France's top cooperages, Francois Frères of Burgundy and Tonnellerie Taransaud. There is only one problem with the barrels of these two cooperages: there are never enough. Interested parties are urged to submit their orders or get on waiting lists as soon as possible.

Two items of news for barrel lovers:

Francois Frères d'Oregon has been producing Oregon oak barrel staves for two years. The results have been excellent. This year Knox will have around 1,200 60-gallon barrels available. As the structure of Oregon oak is quite similar to that of French oak, the flavors and textures are spicy and supple.

Tonnellerie Taransaud is not only making ovals, round casks, and uprights, but they have now created an upright with a stainless-steel top. There is a lid on the top that can be removed for pigeage and/or fermentation. These tanks are made with five-year-old wood!

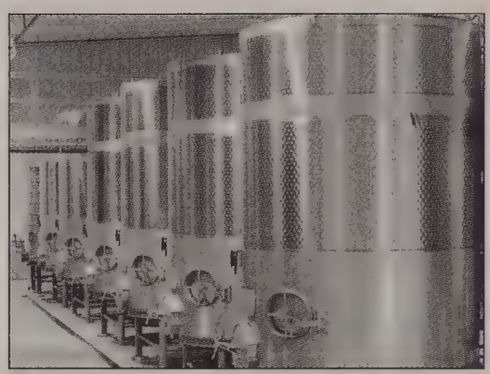
For more information, contact:
Mel Knox Barrel and Bottle Broker
505 29th Ave., San Francisco, CA 94121
tel: 415/751-6306; fax: 415/221-5873

PLEASE SEE THE MEL KNOX AD, PAGE 10.

SANTA ROSA STAINLESS STEEL

Santa Rosa Stainless Steel (SRSS) is the nation's largest producer of tanks for the wine industry, with more than 15,000 tanks supplied to wineries around the world in the last 30 years.

SRSS tanks range in capacity from one gallon to 400,000 gallons. An inventory of 500-, 600-, 3,000-, and 4,500-gallon tanks is maintained in stock for fast delivery at competitive prices.



Santa Rosa Stainless Steel builds tanks for fermenting, storage, and dejuicing, as well as dosage and charmat tanks for champagne. Various types of cooling jackets are available, including channel designs and low- and high-pressure jackets for glycol, ammonia, or freon. The company also manufactures custom aluminum catwalks, stainless steel pumps, press pans, and related equipment.

In addition to providing tanks to more than 800 wineries throughout the U.S., SRSS has shipped tanks to wineries in Asia, South America, Mexico, Australia, Canada, Saudi Arabia, and other countries.

Visit the website at srss.com

For more information, contact:
Santa Rosa Stainless Steel
PO Box 518, Santa Rosa, CA 95402
tel: 707/544-7777; fax: 707/544-6316
e-mail: rod@srss.com; website: www.srss.com

PLEASE SEE THE SANTA ROSA STAINLESS STEEL AD, PAGE 76.

SEGUIN MOREAU

Seguin Moreau, France's oldest cooperage, has been producing French oak barrels for over 150 years and continues this tradition with American white oak in the U.S. Whatever the wood source, Seguin Moreau sets the standard for quality wine cooperage.

The American oak is high quality, hand-selected white oak from the northern midwest. Staves are stacked and air-dried for 24 months at the company's stave mill in Perryville, MO, then shaped and shipped to the Napa cooperage, where master coopers produce barrels in the French tradition. This includes slow toasting over natural wood fires to caramelize the sugars and soften the aromatic components found naturally in wood.

Seguin Moreau's American oak barrels are used to produce fine Chardonnay and Sauvignon Blanc and richly complement red wines such as Syrah, Shiraz, Cabernet Sauvignon, Merlot, and Zinfandel.

Choose from four types of barrels: Bordeaux Chateau, Bordeaux Export (both 225L), 228L Burgundy Export, and 300L hogshead. French oak ovals, tanks, and foudres are also available. Seguin Moreau's drafting department will design larger cooperage to meet your winemaking needs.

Seguin Moreau employs two full-time researchers with the University of Bordeaux, dedicated to unlocking the secrets of barrel ageing of wines.

For more information, contact:
Seguin Moreau
151 Camino Dorado, Napa, CA 94558
tel: 707/252-3408; fax: 707/252-0319

PLEASE SEE THE SEGUIN MOREAU AD, PAGE 112.

PACIFIC DESIGN & MANUFACTURING, INC.

Pacific Design & Manufacturing, Inc. (PD&M) specializes in design/build winery projects. "Our emphasis," according to Steve Koster, senior design engineer and cofounder, "is working early-on with our client in the design phase to produce extremely accurate drawings which reflect the process and equipment needs of the winery. It truly is a case of 'form following function' since each facility has its own unique processing requirements."

Mark Nilson, also cofounder and president, points out that PD&M's added advantage of manufacturing what it designs "assures customers that the same high standard set forth in the equipment specifications are in fact realized."

Chris Hillman, vice president, who recently joined PD&M, will be introducing the all new 'quantum panel' this year. "This is a very exciting development for those responsible for the day-to-day operations of a winery, in particular for larger wineries because the quantum panel allows easy control of all integrated mechanical systems."

Whether it's new construction or a modernization project, PD&M will help formulate a master plan and design that allows for an efficient operation while remaining flexible to changes in the industry. PD&M invites customer inquiries regarding future design projects and the latest news in process equipment.

For more information, contact:
Pacific Design & Manufacturing, Inc.
30 Mill Street, Building D
Healdsburg, CA 95448
tel: 707/431-3516; fax: 707/431-3519

PLEASE SEE THE PACIFIC DESIGN AD, PAGE 84.

NAPA FERMENTATION SUPPLIES

Napa Fermentation Supplies offers a full line of winemaking equipment and supplies, including LA Inox stainless steel tanks in variable capacity with adjustable lids in sizes from 26 gallons to 1,321 gallons and closed top tanks from 79 gallons to 3,963 gallons, with or without manway.

Also available from Napa Fermentation are Karcher hot water pressure washers with 1,300 psi to 3,000 psi and temperatures from 86° to 285° steam; Jabsco pumps, 1- and 1.5-inch with DC or AC inverter drive; Zambelli must pumps, 2- and 3-inch, with AC inverter drive; Zambelli crusher/stemmers from two to 10 tons per hour; Zambelli manual and hydraulic presses; 8-inch Zambelli plate filter; a full line of stainless steel fittings and valves, butterfly and ball; 1- to 4-inch wine hose; labware; refractometers; microscopes; wine thieves; and tabletop labelers.

For more information, contact:
Napa Fermentation Supplies
575 Third St., Bldg. A, Napa, CA 94559
tel: 707/255-6372; fax: 707/255-6462

PLEASE SEE THE NAPA FERMENTATION AD, PAGE 90.

VALLEY PIPE & SUPPLY, INC.

Valley Pipe & Supply, Inc., is a third-generation pipe, valves, and fitting distributor, established in 1940. In 1989 Valley Pipe acquired the patterns of Valley Foundry & Machine Works. This joining of the two companies allowed Valley Pipe to be a full-service supply house to the wine industry and maintain a position of strength in the industrial, utility, and food processing business.

In addition to supplying wineries with Valley pumps, valves, and fittings, Valley Pipe also distributes stainless tubing, fittings, all valves for winery needs, and wine hose.

The Valley Pipe shop assembles all of these materials and fabricates various configurations of valves and fittings for the wine industry.

The company has established a working relationship with several European manufacturers of winery equipment, distributing Defranceschi wine presses, punch-down tanks, Frigopack, and stainless tanks, as well as the Milani crusher/destemmers, rotary fermentors, and Enopompe piston pumps, in sizes from 85 to 700HL per hour.

Valley Pipe & Supply distributes equipment to wineries throughout the U.S., Canada, and Mexico.

Valley Pipe has always prided itself on supplying superior products, and the acquisition of Valley Foundry products, Defranceschi, Milani, and Enopompe equipment continues that pride.

For more information, contact:
Valley Pipe & Supply, Inc.
1801 Santa Clara, Fresno, CA 93721
tel: 209/233-0321; fax: 209/233-1713

MCBRADY ENGINEERING, INC.

McBrady Engineering has more than 150 Orbit bottle rinsers/gas spargers in wineries throughout the world. In the U.S., most are air cleaner/nitrogen injectors, and in Europe, they are water/steam rinsers and sterilizers.

With the Orbit Bottle rinser/gas sparger, nitrogen is injected continuously through individual rinse tubes inserted into the neck of each bottle for direct flushing. For steam rinsers, the jumbo 72-inch diameter Orbit provides three to five seconds of steam injection for sterile bottle rinsing immediately prior to filling. The compact Orbit requires as little as 25 inches of conveyor space on your bottling line conveyor, and offers simple design and almost carefree maintenance.

The combination of the Orbit rinsers, and the four-belt unscrambler provides a single machine assembly for feeding and cleaning your bottles. Only one change of parts is required on most models to run 750 ml, 500 ml, or 375 ml (using plastic inserts), and the new "tool-less change-over" feature makes the changeovers simple.

McBrady offers five Orbit bottle rinsers/gas sparger models, beginning with the low-priced Model #40 for under $13,500. Speeds range from 40 bottles per minute (bpm) for the Model #40 up to 270 bpm with the high-speed Model #220, with its duplex rotor design, which provides twice the rinse/gas injection time.

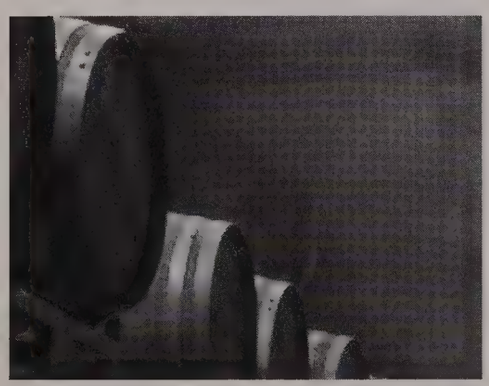
For more information, contact:
McBrady Engineering, Inc.
PO Box 2549, Joliet, IL 60434
tel: 815/744-8900; fax: 815/744-8901
e-mail: McBRADY ENG @ Juno.com
PLEASE SEE THE MCBRADY ENGINEERING AD, PAGE 88

MEE INDUSTRIES, INC.

Mee Industries has been designing, fabricating, installing, and servicing fog systems for over 27 years. Systems to maintain 75% to 95% relative humidity (RH) in barrel storage will reduce wine loss due to evaporation. Without proper humidity control 5% per year of the water content will evaporate through the wood sides of the barrels and alcohol content will go up.

Old style spinning disk–type humidifier systems are often designed based on their full rated output but cannot actually be operated at full output without wetting the floor. This can result in humidity levels dropping to 65% RH or below, enough to result in wine losses of 5% per year.

Mee Fog Systems consist of: √ a high pressure 1,000 psi pump unit; √ water treatment equipment; √ an electrical control panel; √ copper distribution tube and fittings; √ Mee Fog nozzles, 10 micron droplet size; √ humidity controls, zone valves, motor speed control, etc., as per project requirements.



For more information, contact:
Mee Industries, Inc.
Randy Foote
204 W. Pomona Ave., Monrovia, CA 91016
tel: 626/359-4550; fax: 626/359-4660
website: www.meefog.thomasregister.com
PLEASE SEE THE MEE INDUSTRIES AD, PAGE 85.

TONNELLERIE RADOUX USA

The art of Tonnellerie Radoux is to offer the winemaker the richest palette of aromas to enhance the character of each wine.

Tonnellerie Radoux is introducing a new item to expand its product line of American and French oak barrels, puncheons, casks, and upright tanks. The **Mix Barrel** is made of French oak head pieces (which represent 30% of the total surface) and American oak staves which allow an interesting blend of French and American oak flavors.

Successful trials with Spanish varietals (in La Rioja and Ribera del Duero, Spain) as well as French varietals such as Cabernet Sauvignon, Syrah, Merlot (in Languedoc-Roussillon, France) lead Tonnellerie Radoux to extend distribution of this product to its international markets: California, Australia, and South Africa.

The company goals are to develop its presence in emerging wine-producing markets and to strengthen its position in the American oak market while carrying on its foremost mission: "To Respect Wine."

For more information, contact:
Tonnellerie Radoux USA
578 Martin Ave., Rohnert Park, CA 94928
tel: 707/588-9144; fax: 707/588-8547
PLEASE SEE THE TONNELLERIE RADOUX AD, PAGE 67.

VINCENT BOUCHARD COOPERAGES Barrel Broker

Vincent Bouchard Cooperage represents Les Tonnelleries de Bourgogne — an association of Tonnellerie Damy (Meursault) and Tonnellerie Billon (Beaune) — Tonnellerie Vicard (Cognac), Tonnellerie Lafitte (Cognac), and Tonnellerie Cadus (Ladoix-Serigny).

Damy and Billon have both earned the CTB quality certification and are highly respected by producers of Chardonnay and Pinot Noir. They have been providing barrels and puncheons (350L to 500L) to American wineries for over 17 years.

VINCENT BOUCHARD COOPERAGES (PVS SA)

Tonnellerie Vicard is certified by the Bureau Veritas International for its barrel fabrication process (ISO 9002). Vicard produces various dimensions of barrels, puncheons, and oak tanks. Barrel heads are toasted upon request over an exclusive oak-chip fire.

Tonnellerie Lafitte, managed by Jean Vicard, specializes in production of high quality Bordeaux barrels and puncheons from American and hand-split Hungarian oak air-dried for three years.

Tonnellerie Cadus is a recently organized partnership of Maison Louis Jadot of Burgundy, Tonnellerie Vicard, and Vincent Bouchard, a ninth generation Burgundian enologist. Three-year air-dried wood is used exclusively. Two different house toasts are available, depending on the desired maturation period of the wine in barrel (for fast versus slower development).

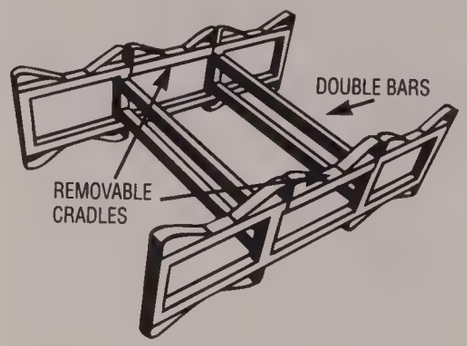
For more information, contact:
Vincent Bouchard Cooperages, Barrel Broker
Roberta Manell-Montero
PO Box 2322, Napa, CA 94558
tel: 707/257-3582; fax: 707/254-0852

WESTERN SQUARE INDUSTRIES

Western Square Industries is the industry's largest supplier of portable (forklift-able) steel barrel racks. Standard two-barrel models include two high-profile types (sometimes called topping racks) and a low-profile model which is also a topping rack, since wine can also be worked in place when it is used. Other standard items are: a rack for the bottom tier of barrels, which can be pallet-jacked from all four directions, and a rack for four barrels.

Standard models will accommodate all barrels from 200L to 275L, but special models are also available. Regardless of what racks your winery uses, Western Square can supply racks that will co-stack.

For those wineries still stacking barrels in pyramids, Western Square makes a cradle that replaces four chock blocks and thereby facilitates stacking.



Western Square offers two handy devices for holding a single barrel above tiers of two barrels, useful when you have an odd number of barrels in a lot. One is the old pyramid cradle, and the other is the new removable center cradle (see photo with double-bar rack, the best model two-barrel rack).

Western Square also makes a barrel-washing system specifically for use with portable racks.

For more information, contact:
Western Square Industries
1621 N. Broadway, Stockton, CA 95205
tel: 209/944-0921; fax: 209/944-0934
or 1500 Whitehall Ln., St. Helena, CA 94574
tel: 707/963-1584; fax: 707/963-7213
PLEASE SEE THE WESTERN SQUARE AD, PAGE 24.

RLS EQUIPMENT CO., INC.

RLS Equipment has been providing the wine industry with quality equipment and personal service for more than 37 years. RLS is the factory authorized agent in North America for Kiesel, Magitec, PERA, and Strassburger. RLS can supply your winery with a complete crushing and pressing facility, and its complete product line affords the opportunity for convenient one-stop shopping.

The Magitec stemmer/crushers and receiving systems are available in capacities from 15 to 75 tons/hour, with efficient design, durable construction, gentle action, and very affordable prices.

PERA membrane presses are available in 30hL to 320hL capacity with either an open slotted or enclosed drum configuration. The PERA H1000 stemmer/crusher has also proven itself as a consistent 100+ ton/hour unit.

Kiesel progressive cavity pumps are available in both hopper and in-line style from 1,000 liter/hr to 200+ cubic meter (tons)/hour.

RLS also offers a complete line of stainless steel fittings, valves, and accessories, from DIN thread to racking arms to tri-clamp vents. RLS also offers a domestically produced replacement membrane for most manufacturers. RLS maintains an extensive inventory of used winery equipment.

For more information, contact:
RLS Equipment Co., Inc.
1017 White Horse Pike, Egg Harbor, NJ 08215
tel: 609/965-0074; fax: 609/965-2509
or West Coast tel: 800/527-0197
PLEASE SEE THE RLS EQUIPMENT AD, PAGE 41.

CRIVELLER COMPANY

More than 25 years of worldwide, hands-on experience makes Criveller Company a name you can trust.

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From D.E. and plate filtration to cartridge housing, Criveller Company offers the latest designs and developments in filtration technology, including a recently introduced rotary vacuum drum filter.

Pasteurization and refrigeration are also a part of Criveller expertise. The engineering department offers full assistance in solving any and all technical queries.

Criveller Company takes pride in representing world-renown manufacturers of complete bottling lines, including rinsers, fillers, cappers, and labellers.

Criveller offers a wide variety of monoblocs and triblocs, which combine the bottling and closing functions of your wine in a single machine. It provides the latest technology with the greatest simplicity for both small and large producers.

Whether you need manual equipment or totally automated packaging lines, Criveller's technicians and on-staff personnel have real-world experience to ensure complete customer satisfaction.

For more information, contact:

Criveller Company
U.S.: PO Box 162, Lewiston, NY 14092
Canada: 6935 Oakwood Dr.
Niagara Falls, Ontario, Canada L2E6S5
tel: 905/356-2930; fax: 905/374-2930
e-mail: cri@crivellerbrew.com
website: www.crivellerbrew.com

PLEASE SEE THE CRIVELLER COMPANY AD, PAGE 117.

TONNELLERIE BOUTES

Tonnellerie Boutes, located in the heart of the Bordeaux region of France, has been providing fine French oak barrels to U.S. wineries for 16 years. Each year, Boutes purchases standing oaks at the National Forestry Department auctions in Allier to insure the highest standard of quality and consistency for its barrel production.

Boutes offers a special water-soaking method unique to Boutes that is performed during the early stages of wood maturation. The staves are removed from the drying yard and placed in concrete holding tanks. The tanks are filled with fresh water completely submerging the staves. There the staves can remain for up to two months. During that time the water is replaced weekly with fresh water. This soaking process is designed to uniformly leach out the harsh wood tannins and leave behind only the soft desirable tannins.

This watering technique created by

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Peter May
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BOUTES
TONNELLERIE DE FRANCE

Boutes allows your wines to achieve a well-balanced integration of wood and fruit that will compliment the most delicate wines.

To learn more about this soaking method and how Tonnellerie Boutes can produce that special barrel for your wines, call today.

For more information, contact:
Tonnellerie Boutes
Ken Seymour
2320 Creekside Rd., Santa Rosa, CA 95405
tel: 707/542-1158; fax: 707/544-7684
PLEASE SEE THE TONNELLERIE BOUTES AD, PAGE 85.

THE BOSWELL COMPANY

Boswell Company represents new American, French, and Hungarian oak barrels from Mendocino Cooperage. To further help winemakers find superior barrels, Boswell markets new barrels from three specialized coopers in France.

Tonnellerie Berger is a family company operating near Paulliac in the heart of the Medoc area. The workshop at Vertheuil produces 18-22 mm stave thickness Bordeaux barrels, aging the entire stave inventory for 24 months minimum. This tonnellerie has supplied red wine barrels to the great chateaux of the Medoc for over 40 years.

Tonnellerie Bossuet is a "merrandier" (stave splitter) and cooperage located in the Charente-Maritime region. Jean-Louis Bossuet personally selects French oak trees and logs in the forest for his tonnellerie's stave production. Bossuet's tight-grain Bordeaux style barrels are purchased primarily for Merlot by St. Emilion and Pomerol wineries.

Tonnellerie de Mercurey is a Burgundian cooperage owned by Nicolas Tarturet and managed by Bruno Lorenzon, a winemaker with his own small domaine in the village of Mercurey. All oak for the company is supplied by Tarturet's mill in the Champagne area. Toasting is 100 minutes per barrel minimum at de Mercurey. This year's U.S. allocation is limited to 1,000 Burgundy barrels.

The Boswell Company also supplies quality cellar tools including hand-blown French glass wine thieves, domed silicone rubber bungs, stainless stirring rods, Bulldog's Pup racking wands, foot valves, sponge rubber hose cleaning balls, and stainless steel spray cleaning heads for barrels/tanks.

For more information, contact:
The Boswell Company
1000 Fourth Street, Suite 640
San Rafael, CA 94901
tel: 415/457-3955; fax: 415/457-0304
PLEASE SEE THE BOSWELL COMPANY AD, PAGE 86.

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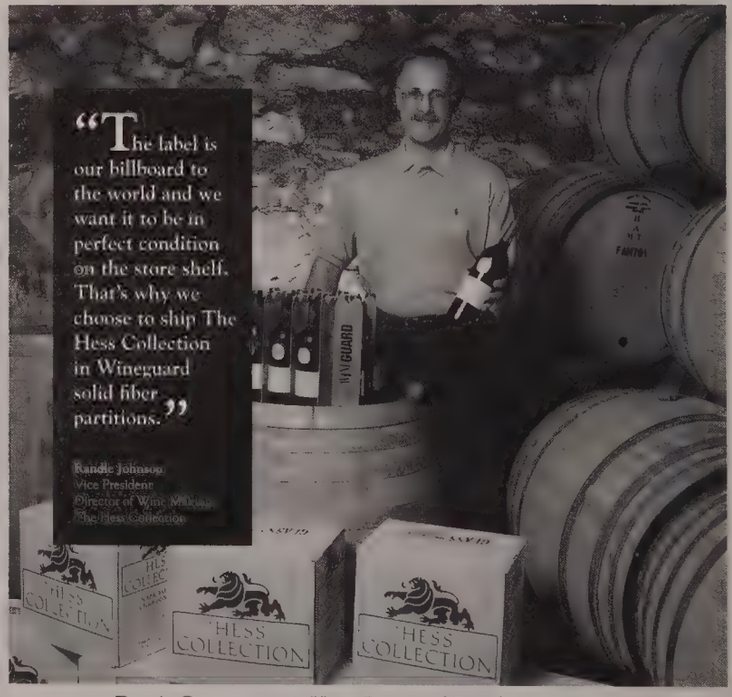
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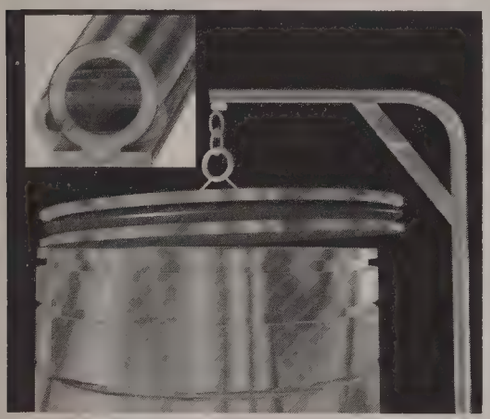

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PLEASE SEE THE PRESRAY AD, PAGE 50.

MENDOCINO COOPERAGE

Mendocino Cooperage crafts new wine barrels from oak trees grown in America, France, and Hungary. The company is guided by Keith Roberts, a master cooper trained in France with 25 years of experience. His brother Craige manages daily barrel production in Hopland, CA, and Keith's two sons are skilled coopers who supervise in the workshop.

In 1998, Mendocino Cooperage completed a new 27,000-sq.ft. facility dedicated to premium wine barrel production. Stave jointing for all oak types is now accomplished at the original cooperage building adjacent to the new production facility.

Raw oak staves for Mendocino Cooperage wine barrels are selected from specialized mills in France, Hungary, and the U.S. To produce quality French and Hungarian barrels, Keith Roberts travels to Europe each year to visit forests and consult with stave splitters.

Three different American white oak origins are sourced and designated: Appalachian, Ozark, and northern oak. Staves and head pieces are air-dried and seasoned for a minimum of 24 months at the company's stave yard in Albany, KY, a site optimum for softening the textures of the wood since annual average rainfall is 65 inches with humidity above 80%.

Traditional French toasting is performed in Hopland. Carefully monitored oak fires in "braseros" slowly heat the wood. In addition to Bordeaux and Burgundy shapes, the cooperage offers 70-gallon capacity barrels in all types of oak to save money, space, and labor in wineries.

Mendocino Cooperage is committed to providing excellent value for your cellar with uncompromising barrel quality.

For more information, contact:
The Boswell Company, sales agent
tel: 415/457-3955; fax: 415/457-0304
Mendocino Cooperage
Raymond Willmers, marketing manager
12910 East Side Road, PO Box 611
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PLEASE SEE THE MENDOCINO COOPERAGE AD, PAGE 119.

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CALENDAR

Friday, February 12, 1999
Oregon Winegrowers' Association
Annual Meeting , OSU Grape Research Day, and Trade Show
Location: CH2M Hill Alumni Center at Oregon State University, Corvallis, OR. **Contact:** Oregon Winegrowers' Association, tel: 503/228-8403; fax: 503/228-8337.

Friday-Sunday, February 26-28, 1999
Indiana Wine Grape Symposium
Sponsored by Indiana Winegrowers' Guild, Indiana Wine Grape Council, and Purdue University to focus on Total Quality Management.
Location: Bloomington Convention Center, Bloomington, IN
Contact: Steve Thomas, Thomas Family Winery, tel: 812/273-3755; email: sthomas@seidata.com.

Monday-Wednesday, March 22-24, 1999
Annual New York Wine Industry Workshop
SEMINARS: Day-1 is for beginning growers and will cover initial planning for vineyard/winery operations, including overview of vineyard enterprises, developing a business plan, costs of vineyard establishment, economics of start-up wineries, and financing of new operations.
Day-2 is for both new and established growers, and will cover vineyard establishment, including site selection, variety options, pre-plant preparation, vineyard layout and planting, and vine training. Day-3 will cover starting and expanding wineries, including legal requirements, siting a winery, winery design, equipment needs, and waste handling.
Location: Ramada Inn, Geneva, NY. **Contact:** Nancy Long, Dept. of Food Science & Technology, New York State Agricultural Experiment Station, Cornell University, Geneva, NY, tel: 315/787-2288; fax: 315/787-2284; e-mail: np11@cornell.edu.

Monday-Tuesday, June 28-29, 1999
International Symposium on Oak in Winemaking
Sponsored by American Society for Enology & Viticulture at the Reno Hilton, Reno, NV. **Inquiries to:** Andrew Waterhouse, ASEV, PO Box 1855, Davis, CA 95617, tel: 530/752-4777; fax: 530/752-0382; email: alwaterhouse@ucdavis.edu.

Wednesday-Thursday, June 30-July 1, 1999
50th Annual Meeting of American Society for Enology & Viticulture
Inquiries to: ASEV, tel: 530/753-3142; fax: 530/753-3318; email: society@asev.org. **Location:** Reno Hilton, Reno, NV.

Wednesday-Friday, July 14-16, 1999
Oak from Forest to Glass: Practical Management of Oak and Wine
International meeting will bring together suppliers, winemakers, and research personnel to discuss the practical applications of oak in winemaking. Annual Meeting of the American Society of Enology & Viticulture, Eastern Section will follow on July 17.
Location: St. Louis, Missouri
Contact: E. Harkness, Dept. of Food Sciences, Purdue University, W.Lafayette, IN 47907, tel: 765/494-6704; fax: 765/494-7953; email: harkness@foodsci.purdue.edu. **See ad page 79.**

5th International Symposium on
Cool Climate Viticulture & Enology
January 16-20, 2000, Melbourne, Australia
The will be first time the International Symposium on Cool Climate Viticulture & Enology will be held in Australia. The Melbourne Symposium is being jointly organized by the Victorian Wine Industry Association, and Australian Society of Viticulture & Oenology, with assistance of the New Zealand Society of Viticulture & Oenology.
Many pre- and post-Symposium tours of the cool climate production zones of Victoria, New South Wales, South Australia, Western Australia, Tasmania, and New Zealand are planned on the eve of Vintage 2000.
Contact: fax: 011-613-9682-0288; e-mail: coolcimate@icms.com.au; website: www.icms.com.au/coolclimate.

by Dr. Richard Smart

Considering consumer health in planting decisions

Replanting? Deciding which variety to plant used to be pretty simple — plant Cabernet Sauvignon or Chardonnay! Now vineyard plantings are showing more diversity, and Merlot is the flavor of the month. With increasing interest in Rhone and Italian varietals, more people are considering Syrah and Sangiovese. Overriding these considerations is the global trend to increase the proportion of red to white grapes, far beyond the traditional 50/50 split.

Why are growers planting more red? I ask this question around the world, and the answer is quite consistent: for health reasons. The famous "French Paradox" television show was the best news the wine industry could have had. Not only does wine appear the most healthful beverage, but red wine seems to be best of all. In fact, one wonders how long the U.S. government can maintain health warnings on bottles of wine when epidemiological studies indicate the contrary is likely!

How wine protects health

How wine protects health is an intriguing story that has been told previously, in part, by *PWV* in many reports (including Mar/Apr 1993, July/August 1993, Sept/Oct 1993, Nov/Dec 1995, Nov/Dec 1996). Important information continues to come to light from epidemiological studies, which reinforce early messages that red wine, taken in moderation, is good for you. This story has recently been told in the book *The Save Your Heart Wine Book* by Frank Jones, a Canadian journalist, (Stoddart, 1995, ISBN 0-7737-2906-2).

Alcohol (ethanol) itself offers some benefit by reducing blood platelet stickiness and thereby helping to avert blood clots in coronary arteries. However, wine contains phenolic compounds giving extra health benefits, which are also cardio-protective. These compounds prevent the oxidation of low-density lipoproteins, which in turn prevent the buildup of plaque, which can block coronary arteries.

The phenol resveratrol is a phytoalexin that plants produce to fight mildew infections. Resveratrol has been found to be the most active cardio-protective agent in wines, but other phenolic substances in wine, such as catechin, quercetin, myricetin, and caffeic acid, are also effective.

Professor Leroy Creasy of Cornell University (New York) is credited with linking resveratrol in wine to the French paradox. He had been studying how the grape berry produced this phytoalexin to protect itself against Botrytis, when he discovered Japanese research showing that resveratrol is contained in an Asian medicinal herb and demonstrates health benefits, including benefits for the circulatory system.

Wine consumption patterns and health

Will consumers select wines according to their health promoting qualities? This seems to be happening already, with consumers switching markedly to red wines, both in established mature markets, such as Europe and the U.S., and in emerging markets, such as Asia. In the latter markets consumers are switching to wine as a beverage for health benefits and in emulation of the western lifestyle.

Do some varieties produce higher concentrations of health-giving compounds than others, and can some winegrowing regions begin to claim their wines are more healthful than others? Can vineyard management affect levels of these compounds? The answer to all three questions is a clear yes.

Several years ago regional New York newspapers reported that Finger Lakes wines are more healthful than those from California. These claims arose from studies by Creasy, showing that resveratrol contents are higher in New York wines than in those in California, a finding that has been reinforced by independent research at other laboratories. Vineyard regions with moist and humid climates produce more resveratrol than those with hot dry climates. This should be expected if we remember that resveratrol is produced by the berry skins in response to fungal attack.

Red wines have higher resveratrol contents than white wines, because red wine is fermented on grape skins. Comparisons of resveratrol levels in wines from around the world have shown that cool climate wines, such as those from Ontario and Bordeaux, contain higher levels of resveratrol than do warmer climate wines from Australia, California, and South America. Differences have also been found between subregions in Bordeaux and Burgundy. Similar cool-region variations are found in the catechin and epicatechin contents of wine.

There is a correlation between the presence of resveratrol and Botrytis. Studies in Burgundy show that climate conditions favoring infection by Botrytis enhance resveratrol. Paradoxically, if the disease develops extensively in the berries, then resveratrol is destroyed. Thus, years with low levels of disease are associated with maximum wine concentration of resveratrol.

Which grape variety makes the most healthful wine? We may not know the answer to that question, but Pinot Noir wine, especially from cool areas, contains the most resveratrol and catechins. Cabernet Sauvignon wines contain less resveratrol. Pinot Noir also has the highest concentration of catechin and epicatechin, followed by Merlot. Shiraz wines were the lowest in epicatechin.

So what?

What are the implications of all these findings? Are more resveratrol and other phenols better for our health? Consumers apparently think so, otherwise why have they switched to red wine? Perhaps as information becomes more readily available about the effect varietal and region have on these compounds, consumers will vote more definitively with their pocketbooks.

Will this information ever get to the consumers? Frank Jones makes an attempt, by suggesting which wines to pick, based on resveratrol content. He identifies preferred countries and regions, and grape varieties. Can we expect to see more or less of these kinds of articles? There are powerful economic forces around the world that will not want any suggestions made about reduced health benefit from Cabernet Sauvignon and Shiraz produced in hot, dry climates. While the eastern states of the U.S. might not have the marketing muscle to spread the information, the Europeans certainly have. Many of the wine regions of Europe have summer rainfall and hence higher disease pressure. As a result, higher concentrations of these sub-

stances have been demonstrated in their wines.

What about additives?

How about adding resveratrol and other such compounds to wine, even to white wine? Dr. Andrew Walker of UC Davis has prepared synthetic resveratrol identical to the natural material (see *PWV*, March/April 1993, page 44). The National Institute of Health program on the cancer prevention activity of resveratrol is done with synthetic resveratrol. Several pharmaceutical companies are actively pursuing patents.

Creasy has analyzed several natural resveratrol pills, one actually called "resveratrol" and two "grape seed extract" (GSE) pills (which he thinks are pomace). The GSE pills are reasonably high in resveratrol, but the "resveratrol" pill only has a few percent of the amount claimed. Even the GSE pills are low in resveratrol compared to almost any red wine and are very expensive. Creasy calculated that an average red wine is worth about $400 per bottle in terms of resveratrol content compared to the cost of the pills.

Resveratrol synthase genes from both peanuts and grapes have been patented by Bayer Corporation, and they have been successfully introduced into a number of plants including tomato and tobacco. The result may be that grapes will soon not be the exclusive natural food source of resveratrol. Could this gene be inserted into yeast or perhaps directly into grapevine plant material to increase resveratrol production? Could resveratrol eventually be a wine additive?

I cannot imagine that the captains of the wine industry around the world are not considering these important questions, which have significant implications for the future growth and development of their industry.

Though growers may not be directly concerned with these issues when they are deciding what, when, and where to plant today, I expect they will be in the future. ■

Dr. Richard Smart, "the flying vine-doctor" is an international viticultural consultant. Contact him in Australia by fax at 011-612-6584-0121, or by email: vinedoctor@smartvit.com.au. Visit his home page at http://www.smartvit.com.au He visits America frequently and can be contacted at Vinquiry in Windsor, CA, tel: 707/838-6312.

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by D.R. Storm, PhD. P.E.

HARDHATS; 100TH ANNIVERSARY CELEBRATED

Head protection is almost as old as civilization itself. Warring tribes deduced early that skulls were the ideal targets and that an enemy could be quickly subdued with a rock or club to the cranium. It followed logically that protecting your own skull was a good practice. Thus, military head protection was given serious attention long before other protective headgear requirements were given much thought.

Hardhats for firefighters had their own development curve; first giving protection from falling objects that frequently dropped from ceilings and elsewhere during attempts to subdue the typical structural fire. The extension down the back of the classic firefighter helmet gave some additional coverage for the neck and spinal column.

Construction workers have only been using hardhats for 50-odd years. Hard rock miners, who often had to dodge falling rock in underground mines during the mid- to late 19th century, needed a head cover to make their risky, precious metal searches less hazardous.

Development of the first generation hardhats for construction workers occurred in San Francisco, CA, in 1898. Designed for mining use, the hardened leather cap was little more than a stiff baseball cap. The first hardhat patent was obtained by San Francisco entrepreneur E.D. Bullard, who founded the construction safety company that still bears his name.

In the 1940s, it was the Bullard company's practice to award the wearer of its head gear a gold-plated version if they survived a dropped rivet or carpenter's hammer to the head. My uncle, George Storm, survived such an incident and proudly displayed the dented hardhat that saved his life, while leaving the gilded model stored on a library shelf to gather dust.

FOLLOWING UP Y2K (PWV MAY/JUNE 1998)

We gave the Year 2000 (Y2K) computer recognition deficiency a light-hearted treatment in my May/June 1998 column in the hope that readers would be alerted beforehand and not wait until the last minute to take corrective measures. Since then, some useful resources have emerged, and are listed below. They may help you find ways to celebrate and not dread the new millennium.

WEB-SITE	REMARKS
1. *http://www.year2000.com*	*Good for people with computer-based businesses.*
2. *http://www.itpolicy.gsa.gov/mks/yr2000/y201toc1.htm*	*Links to 34 state Y2K resources.*
3. *http://www.manufacturing.net/y2k*	*Expert forum on manufacturing perspective for Y2K.*
4. *http://www.19+0.com/problem.htm*	*Answers basic questions.*
5. *http://www.y2klinks.com*	*Links several Y2K websites together.*
6. *http://www.state.or.us/IRMD/y2k/agencyplan.htm*	*Y2K deadlines and critical path time schedules.*

Understanding belt drives

Wineries require specialized equipment to perform many tasks, from harvesting grapes to finishing wine. The energy required to drive most wine industry machinery is electrical, with electric motor horsepower matched to workload at the end of the power train. This column looks at how motor energy is transferred to the working end of the machinery unit.

Drive types, pro and con

Direct Drive — Given the right set of motor-to-working equipment circumstances, the simplest and most energy-efficient way to transfer energy from the electrical motor shaft to the shaft of the working equipment is direct drive. For example, a wine transfer pump that operates at a fixed speed and pumps against a total head (lift plus friction loss in hose and fittings) that is within the performance characteristic curve for the given pump is a logical candidate for an in-line, direct drive arrangement.

Direct drive systems can use a 90% right-angle gear box to permit the horizontal positioning of the pump, while maintaining a vertical drive shaft that can direct the rotary mechanical energy in an up or down direction as required.

Direct drive units can also operate with variable speed motors (AC to DC conversions) or variable frequency drives (60 Hz. standard U.S. alternating current frequency, or 10, 30, or 50 Hz. European practice, controlled to vary within a given range) that likewise change the speed of the drive motor.

The limit on direct drive applicability is that a variable load at the working end makes the constant speed drive system less able mechanically and electrically because it cannot handle a radical change in power requirements at the load end without damage to equipment.

Chain drives — are much like direct drives in that there is no opportunity for absorbing load surges through the inelastic steel chain without machinery damage.

Belt drives, as described below, are more flexible and thus fit the variable load situation better.

V-belt drives — V-belts have been the drive system of choice for many industrial and automotive applications for nearly 80 years. Why? V-belts operate on the friction principle, and although they are less efficient in transferring energy, they have the ability to "slip" when overloaded. That's why belt drives are used in equipment for work loads that vary over a wide range. The "V" designation comes from the cross-sectional shape of the belt — it's really a flat-bottomed "V." The sheave or pulley has a similar shape to accommodate the belt.

Flat belt drives — Automobiles produced since the early

1980s have all their auxiliary equipment (alternator, air-conditioner, water pumps, etc.) driven by a "serpentine" belt. This belt was substituted for V-belts by the auto industry, because of its mechanical efficiency (more horsepower to the wheels in engines that had to sacrifice horsepower to comply with more restrictive exhaust emission standards.) The flat, serpentine belt does not operate on the friction principle like the V-belt, so how does it deal with varying loads (engine speeds)? A pulley (sheave) was added to the drive train of these engines. It is not fixed but rotates around a lever arm that provides both tension to the serpentine belt and slack when needed with abrupt engine load changes.

Synchronous belts — Synchronous belts can be the most energy efficient of all the belt drives. They are flat neoprene (rubber) belts with teeth on the inside that match the teeth on the outer perimeter of the drive sheave. Because of their configuration and their near frictionless travel over the drive and idler sheaves, constant speed and constant load conditions are required to prevent damage. A load surge on a synchronous belt would rip the teeth from the rubber belt and disable the machine.

The synchronous belt efficiency is impressive when compared to V-belts and chain drives. Chain drives have high losses as a result of heating of the chain rollers as they pass over the drive sheave. Maintaining proper lubrication and sprocket alignment on chain drives could produce efficiencies of 92% to 95%. V-belts are also subject to high losses if the belt tension is not carefully maintained or the V-belt drive sheave and load sheaves are not perfectly aligned. At best, V-belts can range from 90% to 95% efficiency. The synchronous belt drives, when properly maintained, can achieve uniform efficiencies of 98%.[3,4]

If a belt conversion was made from a V-belt to synchronous belt on a particular piece of winery equipment, it may be possible to operate it with less horsepower and thus a smaller motor. If there is an increase of electrical/mechanical efficiency of 5% to 10%, such a conversion could be worthwhile. However, modifications to existing belt-driven winery equipment, should only be made with the recommendation, guidance, and approval of the original manufacturer or its authorized agent. To do otherwise would void all warranty protection for the winery. The foregoing discussion is intended to suggest other possible methods of after-sale retrofits of belt-driven equipment to achieve higher levels of electrical-mechanical efficiency. ■

David Storm is a consulting civil/sanitary engineer who specializes in winery utility systems and the owner of the Winters Winery. He is the author of Winery Utilities: Planning, Design and Operation.

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1. Anonymous, 1998: "From the Hard-Boiled Hat to Today's Skull Bucket." *California Builder and Engineer,* Feb. 16, 1998.

2. Hodson, C. 1998. "The Year 2000 and Counting." *Pollution Engineering;* June 1998. p.86. A Cahners Publication.

3. Anon., *1997. Technical Manual, Poly-Chain Belt.* Gates Rubber Co., Denver, CO. p. 71.

4. Anon., 1983. *American National Standards Institute,* RMA IP-24, Synchronous Belt Standards.

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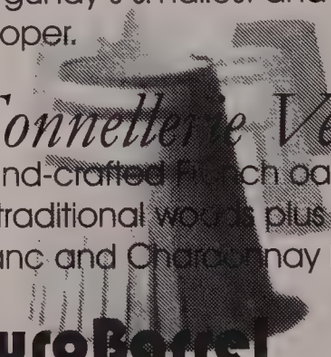

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ozborndooli Architecture	39	707/542-3770	707/542-3771	Susan Ryan
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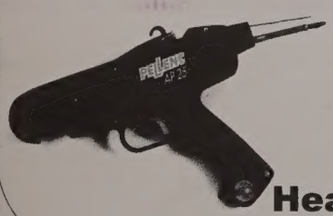

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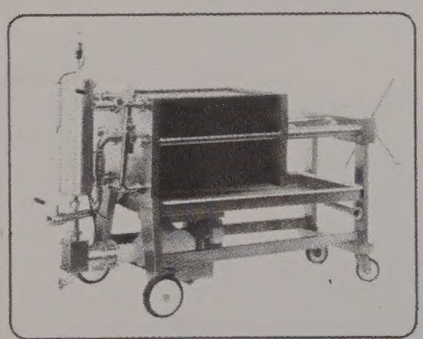

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Five California wineries recognized for reducing waste

by Millie Howie

Practical measures to improve the environment, by reducing waste and increasing the efficiency of resource use, has brought recognition to five California wineries from the Integrated Waste Management Board of the California Environmental Protection Agency in its 1998 Waste Reduction Awards Program (WRAP).

Wineries earning the privilege of displaying a WRAP winner logo on their products and in their advertising are Beaulieu Vineyard (Rutherford, CA), Fetzer Vineyards (Hopland, CA), Hallcrest Vineyards, Inc. (Felton, CA), Korbel Champagne Cellars (Guerneville, CA), and Shenandoah Vineyards (Plymouth, CA).

Efforts at curbing winery waste, according to Shirley Sobon, co-owner of Shenandoah Vineyards, include shredding waste paper, which is added to the compost pile and spread in the vineyards. In the tasting room, empty wine bottles and cartons are recycled, and corks are donated to craft groups. Wine remaining in bottles at the end of every tasting day is recycled into production of Sobon specialty vinegars, sold at the winery. Styrofoam shipping materials are usually reused, and obsolete labels become note pads.

"Korbel has always been resourceful in its recycling efforts," explains Gary Heck, president and chairman of Korbel Champagne Cellars. "Everything from waste oils, solvents, paint, and laboratory processing chemicals to metals of various types and even aerosol cans routinely find a second life. Plant process water is reclaimed for vineyard frost protection and irrigation. Grape pomace is spread out to dry after harvest, and then trucked to Sonoma Compost Company each spring. Every year, more than 500 tons of cardboard are baled and sold."

In addition to recycling all glass, stretch film, and shipping plastics, Korbel recently purchased a magnetic cross-conveyor from Carlsen & Associates (Healdsburg, CA), which separates crown caps and plastic bidules. In one year, the conveyor made it possible to recycle 85,000 pounds of crown caps and 30,000 pounds of plastic bidules. "Over a five-year period," says Heck, "we have reduced our large container refuse-to-landfill costs by 50%."

Environmental concerns are one of the cornerstones of the smallest award-winning winery, Hallcrest Vineyards. As co-owner of The Organic Wine Works (part of Hallcrest), John Schumacher, winemaker, uses only bentonite as a fining agent, due to Hallcrest's status as 100% organic. Bentonite is typically added in the juice stage for protein stabilization. "For filtration," says Schumacher, "we use crossflow filtration technology that is self- scrubbing, with the result that we only have to change cartridges once every five years. Therefore, no diatomaceous earth or chlorinated filter pads are added to the land fill."

Because the 20,000 case Hallcrest winery is located in the rural Santa Cruz Mountains, with no curbside recycling available, it has always invited neighbors to bring their glass containers to the winery to be recycled. The "Grey Bears," an organization of senior retirees, helps with collection. Used wine bottles are sorted by color and shape and shipped to Encore in Richmond, CA, a company that cleans and sterilizes bottles and sells them for reuse. Hallcrest buys clean, sterilized bottles from Encore. "We even have a number of artists nearby who melt down colored glass to use in their artwork," adds Shirin Schumacher, Hallcrest co-owner, "and that provides a unique form of recycling."

Much of the recycling success at Fetzer Vineyards can be tracked from 1990, when the winery bought its first garbage truck and started doing its own hauling. "Now we have a nine-cu. yd, compactor truck, so we know exactly how much waste is going to the landfill," says Patrick Healy, purchasing and environmental manager. "From 1990 to 1991, we reduced waste by 50%. By 1997, we had reduced the volume from 1,724 to 119 cubic yards, for a 93% reduction. Decreasing that remaining 7% will be more difficult, but we have purchased a used metal building at auction and will pour a concrete pad and have our own tipping floor for sorting."

Glass and office paper are recycled through a local service, and cardboard and plastic are baled and sold to Perry Holmes, a broker, in Colorado. "Corks that are substandard from our processing plant are sold to a firm in Mexico which converts them to barstops and sell them," adds Healy. At Fetzer's Food and Wine Center in Hopland, bins are provided for recycling plastic, tin, and milk cartons. Pomace is integrated into compost, which is spread in vineyards.

Waste reduction practices at Beaulieu Vineyard, which have earned the winery five previous WRAP awards, include composting efforts and recycling of glass, paper, corrugated cardboard, and plastic wrap. Beaulieu's cork recycling program benefits the community, with more than 50,000 corks sent annually to day care centers, elementary schools, and the East Bay Depot for Creative Reuse (Oakland, CA). Used wine bottles go to Encore for sterilization and reuse. In addition, the winery has increased use of wax caps in place of tin capsules on all Coastal brand wines and 3L bottlings.

Armond Rist, Jr., director of operations at Beaulieu, oversees the waste reduction program and employee participation. Positive results in paper waste reduction have been achieved through increased use of e-mail, voice mail, and routing slips, along with purchase of post-consumer recycled office paper supplies, janitorial paper products, shipping boxes, stationery, and business cards.

Any California winery or vineyard which can show it has taken effective measures to reduce the amount of non-hazardous waste sent to landfills, can apply for a WRAP award. Each business is evaluated on its efforts to reduce, reuse, and recycle waste; purchase recycled products; and educate employees on waste reduction opportunities. The next application period will be in spring 1999. Request an application by calling 916/255-2497, fax: 916/255-4580, or write to: WRAP Coordinator Linda Hennessy, Waste Prevention & Market Development Division, 8800 Cal Center Drive, Sacramento, CA 95826. ■

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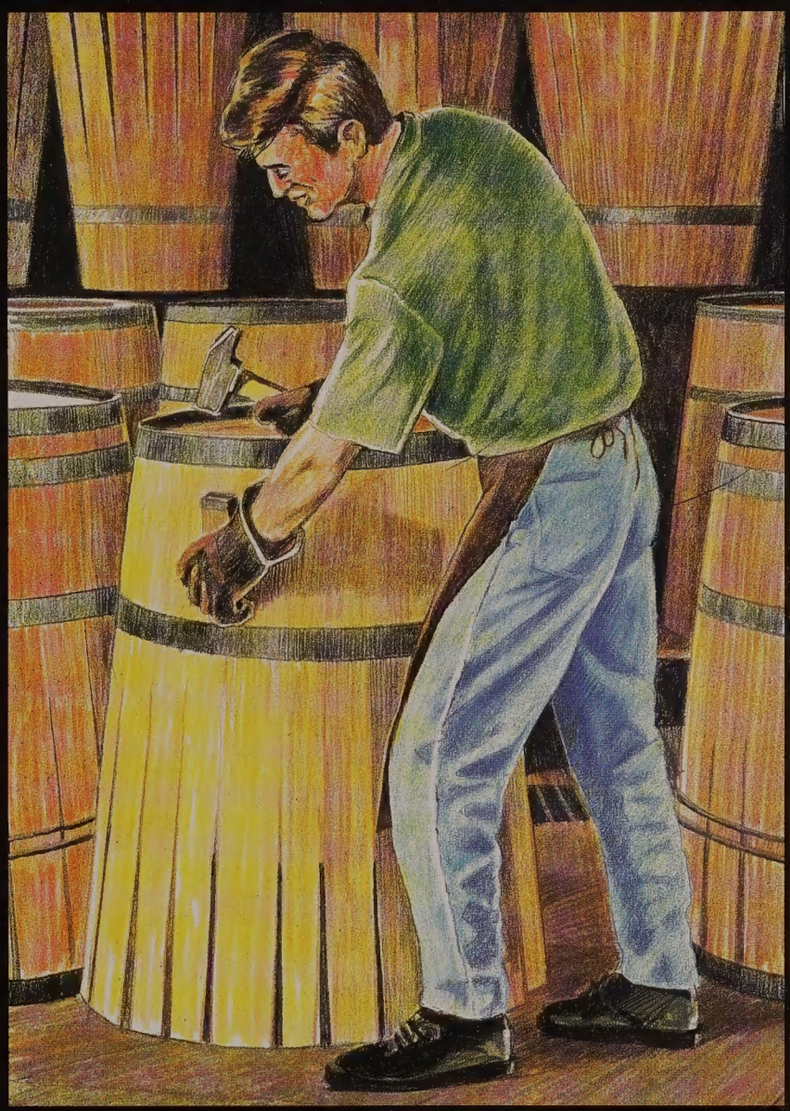

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